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ABSTRACT

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT3I) is a cooperative effort among education and research institutions in New Mexico to analyze problems in transferring environmental technologies from Department of Energy laboratories to small and medium enterprises (SME's). The goal of the ECMT3I is to understand how SME's transfer technology into their facilities and how assistance providers, such as community colleges, can develop partnerships with the SME's to enhance technical and educational activities. Through initial surveys and pilot projects, ECMT3I discovered that most SME's in New Mexico did not currently view community colleges, universities, and federal labs as sources of training, information, or problem solving. As a result, the ECMT3I developed a model for transferring information from assistance providers to SME's, focusing on the elimination of duplication of efforts and the strengthening of communication. Key elements of the model include the establishment of a primary contact for SME's requesting assistance, the cooperation of all assistance providers to work together as a team, the use of New Mexico's State Technology and Assistance Resource System (STARS) as a central database for all assistance providers, and the inclusion of the SME as a part of the solution. In addition, SME's are tracked through the assistance process via STARS and the model contains a proactive marketing component. Appendixes provide a description of the IDEF-Zero activity model and charts of the ECMT3I's model for technology transfer. (KP)

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SMALL ENTERPRISE

Environmentally Conscious Manufacturing Technology Transfer and Training Initiative

TECHNOLOGY TRANSFER FACILITATORS

(ECMT^{3}I)

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Technology Transfer Model Report

September 24, 1993

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ENVIRONMENTALLY CONSCIOUS MANUFACTURING TECHNOLOGY TRANSFER AND TRAINING INITIATIVE ($ECMT^3I$)

TECHNOLOGY TRANSFER MODEL REPORT

September 24, 1993

ACKNOWLEDGEMENTS

Many people have assisted in the planning and execution of this technology transfer model. The ECMT³I Team put in many long hours and we'd like to acknowledge their efforts. Thanks to Erich Strebe, STARS Coordinator; Small Business Development Centers; Frank Renz, Executive Director, New Mexico Council of Independent Colleges; Sheila Ortego, Head of External Programs, Santa Fe Community College; Jeff Weinrich, Los Alamos National Laboratories; Debra Belasich, Sandia National Laboratories; and Bill Harlos, Manufacturing Productivity Center. A special thanks to Whitney Wolf and Jeanne Evans of Sandia National Laboratories for assistance in the use of quality tools. To our customers—the many manufacturers who spent time with us, providing an understanding of their requirements for a tech transfer interface—we extend our sincerest appreciation. We especially thank Robyn Stiefeld of Sandia Labs for her leadership and direction.

TABLE OF CONTENTS

Section			Page
	EXECUTIVE SUMMARY		ES-1
	A.	THE ECMT³I	ES-1
	B.	THE MODEL	ES-1
1	BACKGROUND		1-1
	1.1	STATEMENT OF THE PROBLEM	1-1
	1.2	TECH TRANSFER PROBLEMS AND FAILURES	1-2
	1.3	THE NEW MEXICO ENVIRONMENT	1-4
	1.4	THE ECMT³I INITIATIVE	1-6
	1-5	PROJECT'S GOALS AND OBJECTIVES	1-7
	1-6	MODEL DESCRIPTION	1-8
2	METHODOLOGY		2-1
	2.1	DEFINING THE PROBLEM	2-1
	2.2	DEFINING THE SCOPE	2-1
	2.3	DEVELOPING A WORK PLAN	2-1
	2.4	EMPHASIS ON THE CUSTOMER	2-2
	2.5	DEVELOPING A PROCESS MODEL	2-3
3	RESULTS		3-1
	3.1	TECHNOLOGY TRANSFER PROCESS MODEL DISCUSSION	3-1
4	CONCLUSIONS		4-1
	APPENDIX A		A-1

LIST OF FIGURES

Figure		Page
1-1	New Mexico Manufacturer Size Distribution By State Location	1-4
1-2	Manufacturing Establishments	1-4
1-3	Educational Institutions and Labs	1-5
1-4	The Technology Transfer Linkages	1-6
1-5	Customer Choices	1-8

A. THE ECMT³I

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT³I) program, sponsored by the United States Department of Energy, Office of Environmental Restoration and Waste Management and executed through Sandia National Laboratories, is charged with the task of performing an analysis of the problems of transferring environmental technologies from the DOE laboratories to small and medium enterprises (SME).

The ECMT³I Working Group

In order to establish an effective technology transfer model, an ECMT³I Working Group of laboratory personnel and assistance providers was established. Participants of the working group represented Sandia National Laboratories, Los Alamos National Laboratories, the Manufacturing Productivity Center, the New Mexico Council of Independent Community Colleges, Santa Fe Community College, the Small Business Development Centers, and the State Assistance Resource System (STARS). The Working Group desired an in-depth understanding of business's attitude about environmental compliance and what techniques they currently used to identify, access, and implement environmental technologies. It was also deemed useful to understand the environmental regulators' perception of the success or failure of business's compliance activities. These needs were met in two surveys, the results of which are detailed in a companion report, *New Mexico Manufacturing Environmental Survey*.

The Working Group was also concerned about the past effectiveness of transfering technology from the DOE labs to small and medium businesses. The desire was to develop a technology transfer model that would produce a higher success rate than that which currently exists. This document reports on that activity.

B. THE MODEL

The ECMT³I Working Group was tasked with the development of a process to transfer Environmentally Conscious Manufacturing (ECM) technologies from the DOE complex to small- and medium- size business in the state of New Mexico. The methodology was to be developed using available resources within the state in order to transfer technology.

The Working Group approached the problem of developing the process from two angles: first, understanding how the small business assistance program works; and second, what the

small business owners' needs are when working with either an assistance provider or a technical source of information.

Analyzing how the assistance program works resulted in a series of process steps. These steps detail the activities that occur to move a client from the initial interview to the final delivery of the problem solution. This process model is detailed later in this report.

The activities surrounding the Working Group's interaction with small business owners resulted in a well-defined list of thirty requirements for a successful interface between the client business and the assistance provider or technical resource. The requirements formed the vertical side of a matrix while the process steps formed the horizontal axis. This matrix was used to correlate requirements with process steps to ensure that the client's needs were being met throughout the technology transfer process. A few of the more critical examples of SME requirements are:

- One Contact Point
- Timely Response
- Easy Communication
- Low Cost
- Simple Solutions
- Training Associated With Technology

During the development of the technology transfer model, the Working Group was sensitive to the need for eliminating duplication of effort among different assistance providers and the improvement of communication between client, assistance providers, and technical resources. As a result, the Working Group decided that since most assistance provider organizations had certain strengths, the direction should be to emphasize strengths while simultaneously providing a stronger communication network among assistance providers. Overall, the desire was to strengthen the training capability of the community colleges, the technical implementation ability of the Manufacturing Productivity Center, the business planning expertise of the Small Business Development Centers, etc. Coordinating these activities requires a central organization, such as STARS, to act as an integrator. These two important aspects of the model—elimination of duplication and strengthening of communication—have not been well performed in New Mexico, but were considered by the Working Group as being crucial to the success of any technology transfer program.

The model begins with the SME contacting any of the many assistance providers in the state. After a fact-finding interview, the assistance provider will either service the client, or seek assistance from other assistance providers through a network of organizations. If the SME requires a technical resource, such as a federal lab, the assistance provider can act as an intermediary to secure the technical resource. If training is required, the model describes the activities surrounding the development and delivery of a training package. Several key components of the model are:

- One Primary Contact
- Assistance Providers Work Together as a Team
- Assembly of the Team is Seamless to the SME
- SME is Part of the Solution

This model has several attributes which are missing in the old paradigm of providing assistance to the manufacturing community:

- The SME Becomes the Central Focus of the Activity
- The Assistance Providers are Integrated
- The SME's Progress is Tracked Through the System
- The Model Contains a Proactive Marketing Component
- The Model Contains a Training Component as a Part of the Technology Transfer.

These concepts in the model meet the identified needs of the SME's. If implemented, the above model elements will improve the rate of successful business and technical assistance activities.

The details of the methodology used to develop the model and the explanation of each of the components of the technology transfer model are contained in the following pages of this report.

SECTION 1
BACKGROUND

1.1 STATEMENT OF THE PROBLEM

Manufacturing Modernization: A Critical New Mexico Challenge

Much has been written about the erosion of United States manufacturing competitiveness. According to Phil Shapira in *Modernizing Manufacturing, New Policies to Build Industrial Extension Services*,[1] compared with their major international competitors, U.S. firms have been slow to upgrade their manufacturing capabilities and methodologies. The modernization problem is most serious among small- and mid-sized firms with fewer than 200 employees. Shapira documents that most are not using available modern manufacturing technologies and safe environmental practices and are slow to implement quality control methods and improve workforce training.

There are about 355,000 of these smaller firms in the United States, producing more than one-half of all value-added in manufacturing. Since many of them supply larger firms, this failure to modernize adversely affects the entire industrial base.

In *Manufacturing Technology in New Mexico*,[2] Graham Bartlett explained that, in the coming century, New Mexico manufacturers will face tremendous competitive pressures. To meet this challenge, smaller manufacturers will have to upgrade their production systems; implement environmentally conscious manufacturing techniques; enhance design capability; improve management and management control techniques, product flexibility, and product quality; reduce product cost; seek new markets; and invest in improving workforce skills in order to maintain their focus on quality and productivity.

The National Coalition for Advanced Manufacturing (NACFAM) released a white paper[3] focused on a strategy for federal and state government in areas of manufacturing competitiveness. To quote the Coalition:

> *It must be recognized that competitiveness and productivity are inextricably related. In advanced industrial societies, **manufacturing productivity is the primary engine of economic growth and a prime determinant of a nation's standard of living.** Thus, without growth in manufacturing productivity, the standard of living of the American people will markedly decline.*

The list of requirements for modernization for a manufacturer is long. Failure to implement a significant portion of the litany of necessary requirements for modern manufacturing can mean dwindling markets and eventually, closed doors. One of the fastest growing and rapidly changing requirements is related to environmental regulation compliance. Implementing a pollution prevention, process waste assessment, or energy reduction program is required because of the significant cost savings as well as marketing opportunities that it offers. And yet, we find that half of the small companies in New Mexico have never seen an environmental regulator, are not familiar with the regulations, and, in fact, don't even know which chemicals on their premises are hazardous. Those that are familiar with the issues many times do not know where to go for help. (See the companion report, *New Mexico Manufacturing Environmental Survey.*)

In the coming century, New Mexico manufacturers will face tremendous competitive pressures.

1.2 TECH TRANSFER PROBLEMS AND FAILURES

The requirements to be a competitive manufacturer can be overwhelming for any business, but especially a small company. To be successful, most companies need help, but don't know how to effectively find it. In New Mexico, there have been many programs developed to provide this assistance. The result was summed up in the 1992 Governor's Technical Excellence Committee's report on manufacturing and technology, a review of organizations with a direct or peripheral role in economic development through increased manufacturing which reveals the following statistics. The *1992 New Mexico Statewide Directory of Technology-Related Organizations* listed 144 organizations that have a direct or peripheral interest in manufacturing economic development efforts in New Mexico. At least six of these claim some sort of coordinating role. The *1990-1991 Directory of Manufacturers* lists an additional 105 organizations with the same interests. Regrettably, many do not appear in the other directory, and more organizations are being developed all the time.

> To be successful, most companies need help, but don't know how to effectively find it.

With this kind of assistance, our businesses should be enormously successful! The truth is that most of them have never seen an assistance provider and don't even know where to find one. This is true especially with respect to diffusion of technology (*Manufacturing Capabilities, Needs, and Markets in New Mexico*)[4]. With an abundance of national labs and universities, we should be providing some of the best assistance in the country. We are not. So what is the problem?

Some of the problems lie with the manufacturers themselves. Many different factors inhibit the utilization of the appropriate technology for small- and mid-sized manufacturers. These barriers to modernization include fear of the unknown, fear of loss of jobs, ingrained company practices, financial lenders unable to to comprehend the impact of technology, finance, and government regulations, and lack of skill or knowledge.

Some of the problems relate to our geography. New Mexico is largely a rural state in which geographical isolation constrains contact with technological and educational resources available in urban areas. For example, rural areas generally lack clusters of employment in technology- and research-intensive industries (Rosenfeld, Malizia, and Duan, 1988)[5]. Research centers, universities, and other information resources are less accessible. Networks of scientists, engineers, and technical consultants are less dense, and customers and vendors are farther away. Local economic development agencies tend to have few, if any, paid professional engineers or technical staff. Managers and owners tend to be conservative and not inclined to change established practices, workers skilled in new technologies are hard to find, and training programs may be poorly developed. Additionally, rural banks tend to be unwilling to lend money for technologies they do not understand.

Universities, considered to be a vital source of technology transfer and training, also contribute to the problem. With some exceptions, universities have placed their highest priorities on research and teaching and have generally allocated few resources to assist technology upgrading in manufacturing. The survey conducted by the Working Group showed that very few manufacturers considered the universities to be a source

of technology or of training in environmental technologies. When universities work collaboratively with industry, it is usually with larger firms who have both technical and financial resources to share with faculty researchers (Shapira, 1988)[4].

> Smaller manufacturers rarely provide formal training or skill upgrading programs for their workers.

With universities and research labs, there is a tendency to concentrate the design of their technology transfer programs around the technology itself. This is analogous to developing and producing a product without considering the customer. The result is frequently a failure. To compound this problem, many R&D organizations believe they already know the needs of small businesses and offer their advice and their technology based on misconceptions. Consequently, they neglect to "listen" to the actual needs of small businesses.

Workforce training is another area of weakness, both nationally and in New Mexico. Smaller manufacturers rarely provide formal training or skill upgrading programs for their workers. In *Modernizing Manufacturing*,[1] Philip Shapira states that "smaller manufacturers tend not to participate in public training programs, in part because public training programs are usually not well geared to meet the needs of smaller firms. The lack of training, combined with fewer internal promotion opportunities, means that smaller manufacturers are often unable to develop and retain the skilled labor needed to absorb and effectively operate new manufacturing technologies." Shapira also says that "training is now recognized as one of the critical factors in improving manufacturing performance and making effective use of technology. This seems to be recognized by the [national and state] programs surveyed, since making a referral to a training source is the fourth most frequently provided type of assistance."

Finally, the old paradigms of interacting with a small business obviously do not work. Our community colleges and universities are still not seen by the SME's as sources for training; we still offer seminars for business improvement; and we still send out newsletters (the majority of which are discarded). We need new and innovative ways of communicating with business owners, new ways of providing information, and new methods for demonstrating new technologies and business and manufacturing techniques. However, new paradigms of learning and information transfer will not occur without integrating the government, education, business and manufacturing communities. They MUST be included in the design team.

> We need new and innovative ways of communicating with business owners, new ways of providing information, and new methods for demonstrating new technologies and business and manufacturing techniques.

How has New Mexico dealt with this issue? If one looks back over the last 15 to 20 years, there has been considerable activity. The issue of technology transfer and the desire to provide assistance to small businesses has received a great deal of attention. In our national labs, many programs have been started and then faded away. Success in these programs has been predicated on the enthusiasm and skill of individuals rather than the effectiveness of the institutions. Hence, when the individuals went away, so did the programs. Sadly, this perpetuated the problem that

new programs often repeated the mistakes of previous programs. And no one seems to have the patience to research and learn from the past (or from other states or countries) successes.

1.3 THE NEW MEXICO ENVIRONMENT

New Mexico's major manufacturing sectors include electronics, furniture making, food processing, precision machining and metal fabrication, jewelry manufacturing and mining. Figure 1-1 illustrates the geographical distribution of manufacturers within the Albuquerque Metroplex and those located in other New Mexico communities.

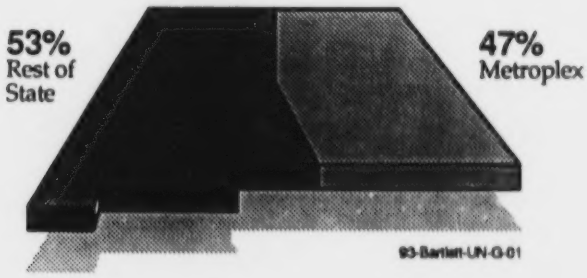


Figure 1-1. New Mexico Manufacturer Size Distribution By State Location

New Mexico's manufacturing base is made up of primarily small manufacturers. Figure 1-2 illustrates the percentages of the relative size of the state's industries compared to the national company size distribution.

Even though it is a rural state, New Mexico has an excellent distribution of community colleges. Figure 1-3 shows the location of the 17 community colleges, the four major 4-year universities, and the two national laboratories.

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT^{3}I) program, sponsored by the Office of Environmental Restoration and Waste Management, United States Department of Energy and executed through Sandia National Laboratories, is charged with the task of performing a process improvement project on the technology transfer process of environmental technologies from the DOE laboratories to small- and medium-sized manufacturers.

New Mexico has a significant business/manufacturing assistance infrastructure, but there is concern that it is not as effective as it could be. If

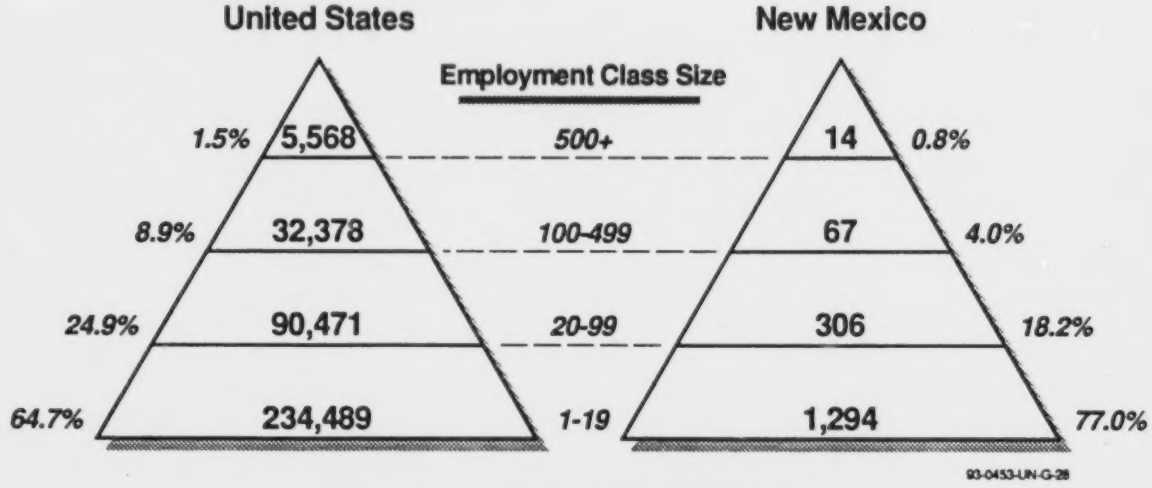
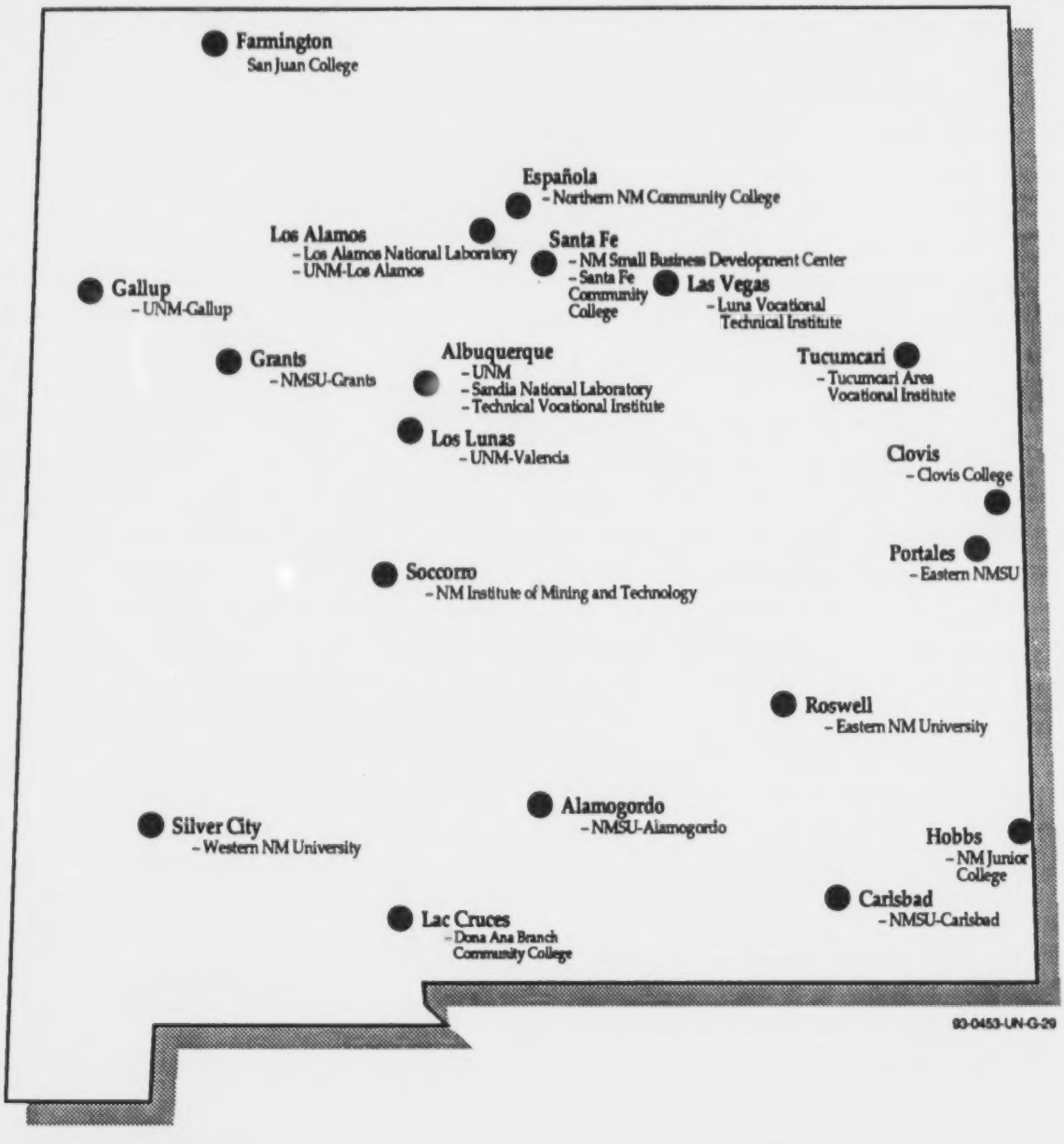


Figure 1-2. Manufacturing Establishments



UNM—University of New Mexico
NMSU—New Mexico State University

Figure 1-3. Educational Institutions and Laboratories

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New Mexico is to become more competitive as an economic entity, this infrastructure must improve. New Mexico has a large number of assistance organizations and efforts and an enviable source of technology from which to draw (the National Labs, large manufacturers, etc.). At the same time, the impact on the business community has not produced broad-based improvements. There have been isolated cases of excellent results, but the grassroots are basically untouched. There is also concern that many companies enter the "assistance system" only to be bounced from agency to agency until they finally give up in despair.

For example, the STARS (State Technology Access Resource System) program was designed to become a focal point for business assistance in the entire state. This organization would take "ownership" of companies entering the system and track their progress to ensure that they received the results they needed. The concept is sound, but unfortunately the program has not fully met its expectations. Greater funding for this concept will help ensure the success of our state's assistance infrastructure.

1.4 THE ECMT²I INITIATIVE

It is critical to understand that the quantity and quality of the assistance providers in the state are not an issue, but rather the interface between the required technologies and the Small and Medium Enterprises (SMEs). This process of linking the two together is the subject of this investigation. The goal is to improve the process, using existing organizations (and not to create new ones).

Figure 1-4 defines the technology transfer linkages. The object labeled "Technology" encompasses any source of technology or information: private industry, university, laboratory, etc. While technology resources may have a great depth of knowledge and capability, they are generally shallow in any particular discipline. Hence, they do not have a large number of knowledgable

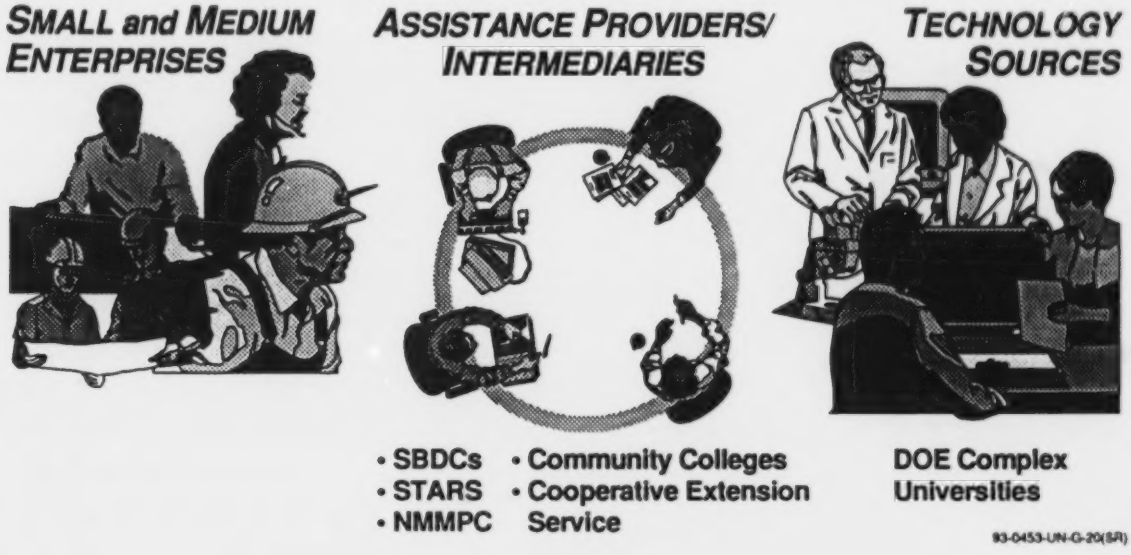

Figure 1-4. The Technology Transfer Linkages

people in one area to make available to solve a particular type of problem. If large numbers of SMEs needed assistance in one particular concept, the technology resource would be overwhelmed.

Likewise, the "intermediary" has a large number of members: the Manufacturing Extension Program, the Small Business Development Centers, the 2-year community colleges, the Cooperative Extension Services, the State Economic Development Department, etc. The intermediaries, who are generally business assistance providers, are well represented in most New Mexico rural communities and have close community ties. While they may not have all the answers to technical questions, they have much better access to the sources of technology than do most SMEs. The direct link between the SMEs and the technology does not occur very often, but when it does it is usually the result of some personal connection between an SME organization and a source of technology.

The intermediaries use a variety of organizations to communicate with the SMEs. Depending on the geographical location or the specific industry, intermediaries work through trade associations, suppliers, utilities, banks, CPA's professional organizations, etc., to communicate with clusters of SMEs. The link between the intermediary and the technology resource is enhanced through entities such as STARS, the Federal Lab Consortium, NASA's Regional Technology Transfer Centers, and others.

Here in New Mexico, our greatest success appears to be through intermediaries. An SME goes to an assistance provider, who in turn has contacts inside the technology organization and can make the connection. The goal of this project is to strengthen the link between the SMEs and the intermediaries and between the intermediaries and the sources of technology.

1.5 PROJECT'S GOALS AND OBJECTIVES

The premise of the ECMT³I program is that process technology transfer between sources of technology and the SME could be improved. A distinction is made between technology transfer for commercialization and process technology, which includes any advanced knowledge, technology, techniques or methodologies that, if provided to the SME, would improve the SME's manufacturing or business processes. The objective of the ECMT³I program is to define and work toward a client-centered technology transfer model. The term *client centered* is crucial in the effort, since it alters the frame of reference from the technology-centered efforts used in the past. To develop a client-centered technology transfer model requires that the client be considered the customer of the business and technology assistance provider organizations in the state, and that considerable effort be expended in understanding the SME's needs and requirements.

The Working Group determined that the success of the program design required an in-depth model of the process from the time a client requests assistance until this assistance is provided. This requires a complete understanding of the SME's needs and requirements for an interface between the SME and the assistance provider/technology resource. The requirements and the process model are then correlated with a matrix to ensure that all the SME's concerns are met with the proposed model. The next step verifies the model through small pilot projects.

1.6 MODEL DESCRIPTION

The model begins with the SME's entry into the assistance provider's system. This system consists of the many government-funded entities designed to help business solve technical, business, and regulatory problems as shown in Figure 1-5. Once the SME makes contact, he will either be serviced or, if the contacted agency cannot provide the service, be referred to STARS. STARS will, through its active network, find the proper agency or source of technology required to meet the SME's needs. Depending on the complexity of the problem, the model describes different approaches to gathering the required resources to solve the client's needs.

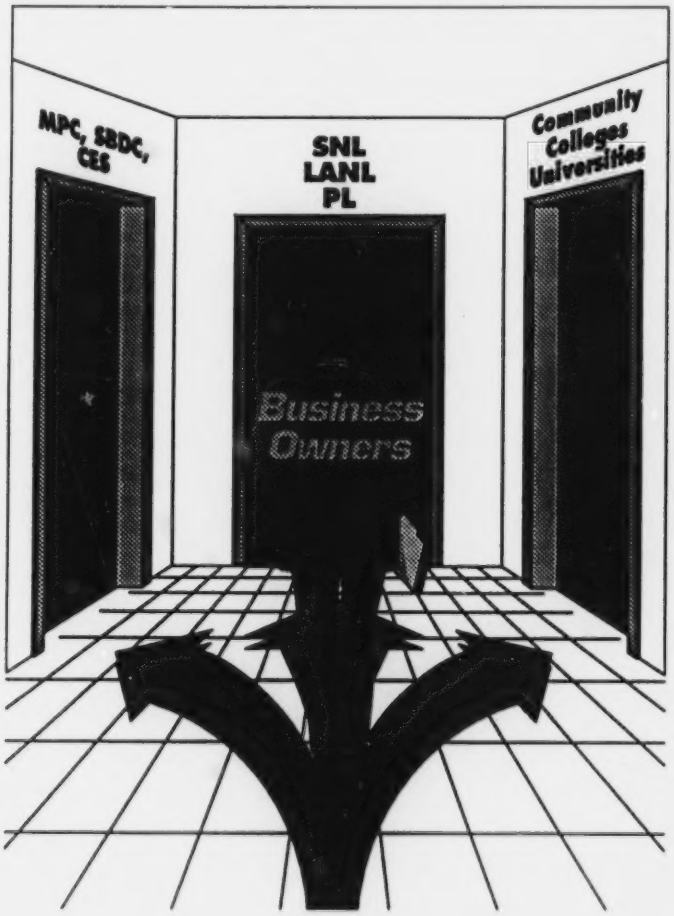

Figure 1-5. Customer Choices

Providing service to the client is as varied as the types of problems presented. The model describes services as basic as providing information to research into a difficult problem, involving research engineers and scientists, finance experts, training capabilities, and technology implementation specialists. How these resources are assembled and a procedure for integrating their capabilities to solve the SME's problem is described in detail later in this report.

The Working Group understands that providing a service network is not sufficient. A more proactive stance is required to move New Mexico business and industry to "World Class" standards. A proactive stance means marketing the technology. In Section 3 the marketing node of the model describes the outreach activities of the assistance providers, which is based on an understanding of how companies in specific industries communicate with each other and with the outside world and current practice issues. Then, using this established communications network, the assistance provider will develop a marketing plan to raise the awareness of SMEs about the requirements needed to be more competitive and about the resources available to assist them.

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2. Bartlett, Graham E. *Manufacturing Technology in New Mexico: A Survey of the Capabilities of Small Manufacturers and the Expectations of Large Manufacturers.* Technology Enterprise Division, New Mexico Economic Development Department.

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4. Nathanson, Jeffrey M., and Graham E. Bartlett. *Manufacturing Capabilities, Needs and Markets in New Mexico.* Final Technical Report. New Mexico Manufacturing Productivity Center, New Mexico Business Innovation Center, Inc. Albuquerque, N. M. 87106, October 1991.

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6. Shapria, Philip. *The National Science Foundation's Engineering Research Centers: Changing the Culture of U.S. Engineering?* Report prepared for the assessment of Technology, Innovation, and U.S. Trade, U.S. Congress, Office of Technology Assessment, Washington, D.C., November 1988.

SECTION 2
METHODOLOGY

2.1 DEFINING THE PROBLEM

Although many programs designed to transfer technology out of research facilities have been developed, few have been successful. The thrust of these programs was either technology-centered or organization-centered, but rarely client or customer-centered. Conversely, the ECMT³I Working Group assessed that the technology transfer model had to be designed to answer the SME's needs and requirements. They also believed that the technology transfer system had to leverage knowledge of the expert by transferring the knowledge to an assistance provider, who could then transfer the concept to the SME. This keeps the expert from being inundated with requests for help from every SME in the state!

Finally, the ECMT³I Working Group decided that traditional methods of providing training to SMEs rarely work. Consequently, they investigated alternative methods of education and training to more effectively meet the SME's needs.

2.2 DEFINING THE SCOPE

Since defining everyone's needs in the entire state was an overwhelming task, the ECMT³I Working Group decided to develop a model based on one industry and, after the successful prototyping of the concept, expand it to other types of industries. It was decided to focus on the jewelry industry and their issues with environmental compliance to pilot the technology transfer project. This industry is predominately considered a Small Business that employs fewer than 20 people in any one organization. It was also predicted that this industry would have problems representative of other small businesses in other industries.

The following are some of the justifications for using the jewelry industry to provide input for developing the model:

- Total employment in NM is 2000 jobs (does not include unlicensed operations)
- Total wages in 3rd quarter of 1992 was $7.9 Million
- Technology needs: solvent substitution, waste water monitoring, stack exhaust monitoring
- Training needs: environmental regulations, safety courses, hazardous material training
- Pending Zero Silver Discharge law.

2.3 DEVELOPING A WORK PLAN

The following tasks were identified as key activities in the development of the model:

- Identify the key environmental compliance issues as seen by the SMEs and the state and local regulators. This task would be implemented by administering a survey.
- Identify the SME's requirements for an interface with the assistance provider's network. This was accomplished through interviewing many small businesses.
- Develop a model of the technology or information transfer and assistance process. The analysis and model building was accomplished by working sessions with a variety of assistance providers.
- Identify weaknesses in the model from the SME's perspective. This was accomplished through the use of a matrix that correlated process steps to SME requirements.

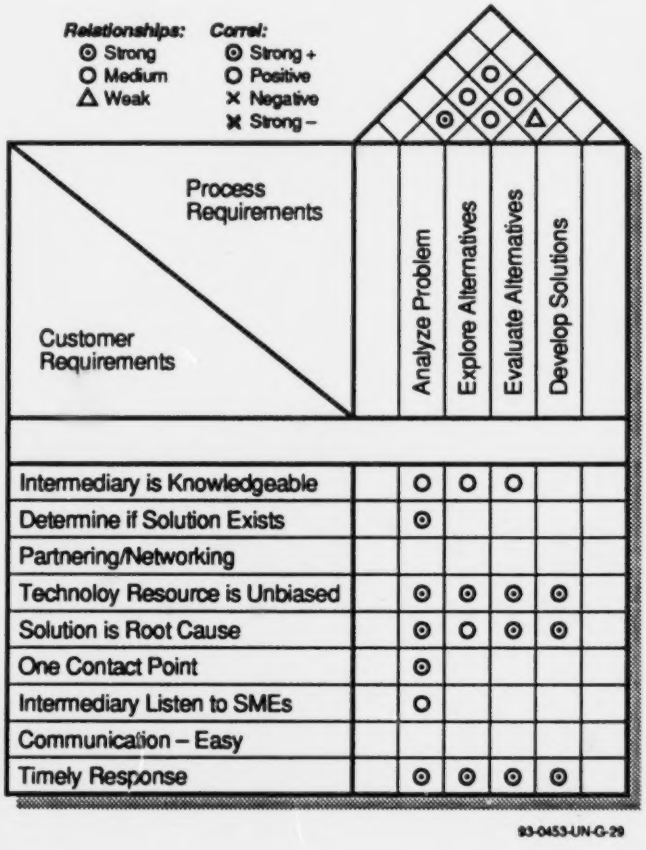
2.4 EMPHASIS ON THE CUSTOMER

The approach used to facilitate this exercise was to translate the term SME or client into "customer" and then apply Total Quality Management (TQM) tools* to reach a better understanding of how to satisfy the customer's needs. The first step was to get to "know" the customer, and understand his/her issues, needs, business, and technology risks. In addition to the survey, many company visits were conducted, complete with plant tours and one-on-one communications. The following companies opened their doors to Working Group members:

- Antony Williams, Santa Fe
- Raychester, Socorro
- Enchantment Jewelry, Albuquerque
- Castings on Parade, Albuquerque
- The Bell Group, Albuquerque
- Mesilla Valley Diamond & Gold, Mesilla Valley
- Native American Coop, Zuni
- Nambe Mills, Santa Fe
- Eight Northern Indian Pueblos, San Juan
- All Indian Pueblo Council

*QFD – A TOOL FOR TQM

Quality Function Deployment, or QFD, is one of the many tools used in Total Quality Management, or TQM. Parts of the QFD methodology were modified to provide the planning tool used in developing the technology transfer model. QFD, as used by the Working Group, is a system for translating client requirements into assistance providers network requirements. QFD starts with client requirements, which are usually loosely stated qualitative items, such as quick response to inquiries, knowledgeable intermediaries, ability to facilitate SME networks, etc. In order to implement technology transfer, the Working Group needed to convert the vague client requirements into actionable internal assistance provider network requirements. Next, the required process steps involved in providing the technology transfer service or assistance were determined. The client requirements and the process steps are arranged in a matrix, which is sometimes referred to as the *house of quality* because of the roof-like structure on top. The *house* can be divided into many *rooms* for analysis purposes, but for this project, we only used the primary matrix and the roof.



After the plant visits, the Working Group brought in a half dozen small business owners for a meeting and put them through a structured brainstorming session on how to deal with the federal laboratories. The result was a definitive list of requirements (from the SME's perspective) for a successful technology transfer between labs and small business. The following companies and organizations participated in the discussion:

- Raychester of Socorro
- The Bell Group
- NM Metal Smiths' Association
- Nambe Mills
- NM Silver Users Association
- All Indian Pueblo Council

This list, along with the information gathered from the survey and plant visits, was developed into "Customer Requirements" that would form the foundation for the process model evaluation.

Figure 2-1 gives the complete list of customer requirements along with their definitions. The definitions were provided by the SMEs. As much as possible, the Working Group tried to use the SME's words, in order to avoid interpreting the definitions. While the definitions are not always formal, they express the feelings of the business owners. The SMEs were asked to rank the items in the list, using the ranking provided. The following were the instructions for the ranking:

"Would you please rate the items on the list on their importance for an effective intermediary. Please assign a rating of 0 through 5 and enter in the space to the right of the term according to the following scheme:

0 - Of absolutely no value at all
1 - Not important, but wouldn't be a detriment
2 - Not critical, but nice to have
3 - Would be an asset for the intermediary
4 - An important requirement for the intermediary
5 - Absolutely critical to have this characteristic for success"

Figure 2-2 gives the average ranking of the requirements by the SMEs.

During the process of scoping the project, the Working Group decided to concentrate on the period of time over which a business owner asked for assistance until the solution was implemented.

2.5 DEVELOPING A PROCESS MODEL

The decision was made by the Working Group to use a modeling methodology that was universally understood and had the capability to handle the complexity of the model. Because of the direct application of the model to technology transfer projects throughout the country, and especially of concern to Department of Energy and Department of Defense projects, the ICAM DEFinition (IDEF) modeling technique was adopted. A brief tutorial of the $IDEF_0$ (Activity Modeling) methodology is included in Appendix A to familiarize the reader with the basic concepts.

Using the SME's requirements for a successful interface between him and the assistance provider and the identified process steps, a matrix was developed. A correlation was made between the requirements and the process steps to ensure that the model addressed all of the important issues. Those areas that show little or no correlation will be the subject of further study to determine how to guarantee that the customers' needs are being met. The "roof" over the matrix identifies process steps which either support each other or are mutually exclusive. The Working Group did not find any antagonistic process steps, but found many which seemed to support each other. The matrix is reproduced in Figure 2-3.

What To Do

INFORMATION
RESOURCE
AVAILABILITY

1. *Intermediary is Knowledgeable*

   The concern is whether the intermediary can learn the technology/ regulations well enough to transfer it to the businessman. Coupled with this is the need to understand the SME's processes to be able to answer questions and to understand possible variations on the technology.

1a. *Initial Contact is Knowledgeable*

   The person is knowledgeable about contacts and resources that are available winthin the state. This will be high-level information (not detailed).

2. *Determine if Solution Exists*

   Verify that the solution is not already out there, through literature searches, problems solved in other industries, etc. Verify the need for research.

3. *Partnering/Networking*

   The intermediary should facilitate partnering to obtain ways to implement and comply with standards and find appropriate partners to help with the problem.

4. *Technology Resource is Unbiased*

   The intermediary must select a technology resource that will take a pro-active, but unbiased stand on environmental issues. Technical experts need to provide data to address the issues, but remain politically neutral.

5. *Solution is Root Cause*

   Engineered rather than band-aid solutions. Don't want personnel protection, but a solution to eliminate personal danger. Want upstream, pro-active solutions.

6. *One Contact Point*

   SMEs have difficulty identifying the right person for help. They need a single point referral service, a delegating body; one phone number with a network to others. A single point is needed for customers.

7. *Intermediary Needs to Listen to SMEs*

   This requirement has been echoed over and over, that the intermediary must try to understand the SMEs needs. The listening to the voice of the customer is a continuous process.

8. *Communication (Short, Bulletized, Easy to Scan)*

   With all of the reading material a CEO receives, he must be able to scan it quickly, pick out the relevant topics, and then access the details. The problem is [that] so many times one has to wade through an article to see if the info is of any value. This includes training resources, delivery systems, and other materials.

9. *Timely Response*

   A request for assistance should have an initial response within 24 hours and be able to initiate action within 5 to 10 working days. An emergency should be responded to in 2 to 5 days.

10. *Funding Identification*

    The SMEs also need help from the intermediary to identify funding for the implementation of the solution.

11. *Intellectual Property Rights*

    This issue must be clear from the beginning of each project, especially when the SME is contributing to the solution.

12. *Not Just Talk - Action*

    Many times the SME will get talked to death, but [obtain] no resolution of issues.

13. *Intermediary Must be Neutral*

    It is essential that the intermediary not just be there to make the "DOE look good."

14. *Application of Technology is Clear*

    The technology use must be concise and specific.

15. *Technology is No Cost or Low Cost*

    Since we are working with small manufacturers, we must be sensitive to their cash flow requirements and understand that the environmental issues are only one area in which they must invest.

16. *Intermediary Includes Industry Experts*

    I have heard industry say many times that in some areas, private industry is years ahead of the labs. For some environmental issues, private industry is forced to find effective solutions - and quickly. Many small companies rely on their raw material vendors to keep them informed of the latest technology development to keep them out of trouble with the environment.

17. *Intermediary Must Be Linked to the Suppliers*

    See discussion above.

18. *Regulation Cost Impact Analysis*

    Define and communicate cost issues. Provide this information to both SMEs and the EPA. SME needs information on the cost of compliance.

19. *Solutions - Simple*

    There is a fear that the labs' solutions [involve a] Ph.D approach. An example is an SME needed to get silver compounds out of solution. A proposed filtration system was expensive. He bought 2 horse troughs, where in a few days, 95% of the compound settles out. Cheap, and it meets his needs.

20. *Database of Resources*

    SMEs need a shopping list centered on people, technologies, etc. They also need published solutions to problems that recur often. Possibly a modem-accessible database.

21. *Labs Up to Industry Level*

    See above discussion. This may be a good opportunity to help transfer technology into the labs.

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Education and Training

22. *Training in New Technology/OJT*

There needs to be training in new technology (and possibly OJT)—training on implementing solutions and new technologies, computer-based manufacturing technologies, etc. through video tapes, workshops, trade shows, satellite, newsletters, etc. to transfer knowledge.

. *Training*

The intermediary should arrange to provide basic awareness training on current issues: basic education to workers, understanding the value of why we need to be concerned about how we use materials and chemicals, and the impact of our actions related to them. The intermediaries need to facilitate more partnerships with training organizations to meet industry training needs.

. *Communicate Cost to Comply Data*

Need a single point clearing house that has the money to work on these issues (providing cost of compliance to industry).

. *Newsletters*

Need more newsletter formatted information sent to different users. The newsletters need information from, for example, the Silver Users Association, general information with input from technical experts, and lessons learned from industry. Need more partnership info to get the newsletters where they should go.

. *Prioritized Issues and Published Solutions.*

This is a pro-active approach. Besides having it in writing, it should be accessible on a database by modem.

Research and Capabilities

27. *Review Standards/Present Papers*

First example is the tri-annual review of the stream regulations, to be held in June or July.

28. *Be Pro-active on Environmental Issues*

The intermediary will seek out and request technical experts to address important environmental issues. These experts must be politically neutral.

29. *Research - Scientific Impact of Standards*

The intermediary/expert will identify research source to perform unbiased research into the effects of varying levels of contaminants on biological and geological systems. This research would not specifically support any one view, but would present only research facts.

30. *Research - Economic Impact of Standards*

Intermediary/Expert will identify research source to perform unbiased research into the effects of varying levels of contaminants on social and economic systems. This research would not specifically support any one view, but would [result in the acquisition of] research facts.

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Figure 2-1.

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	Intermediary is Knowledgeable	4.8
W	Determine if Solution Exists	4.4
H	Partnering/Networking	3.4
A	Technology Resource is Unbiased	3.6
T	Solution is Root Cause	3.8
	One Contact Point	3.6
T	Intermediary Listens to SMEs	4.8
O	Communication—Easy	3.8
	Timely Response	3.4
D	Funding Identification	2.6
O	Intellectual Property Rights	3.8
	Not Just Talk—Action	4.8
	Intermediary Must be Neutral	4.6
I	Application of Technology Clear	4.4
N	Technology is No or Low Cost	3.4
F	Intermediary Includes Industry Experts	4
O	Intermediary Linked to Suppliers	3.8
	Regulation Cost Impact Analysis	4
A	Solutions—Simple	4.6
V	Database of Resources	3.2
L	Labs Up to Industry Level	3.2
E	Training in New Technology/OJT	2.8
D	Awareness Training—Current Issues	3
U	Communicate Cost to Comply Data	3.2
C	Newsletters	2.8
T	Priortized Issues and Published Solutions	3.4
R	Review Standards/Present Papers	3.4
E	Be Pro-active on Environmental Issues	3.8
S	Research-Scientific Impact of Standards	4.2
H	Research-Economic Impact of Standards	4.2

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0 - Of absolutely no value at all
1 - Not important, but wouldn't be a detriment
2 - Not critical, but nice to have
3 - Would be an asset for the intermediary
4 - An important requirement for the intermediary
5 - Absolutely critical to have this characteristic for success

Figure 2-2.

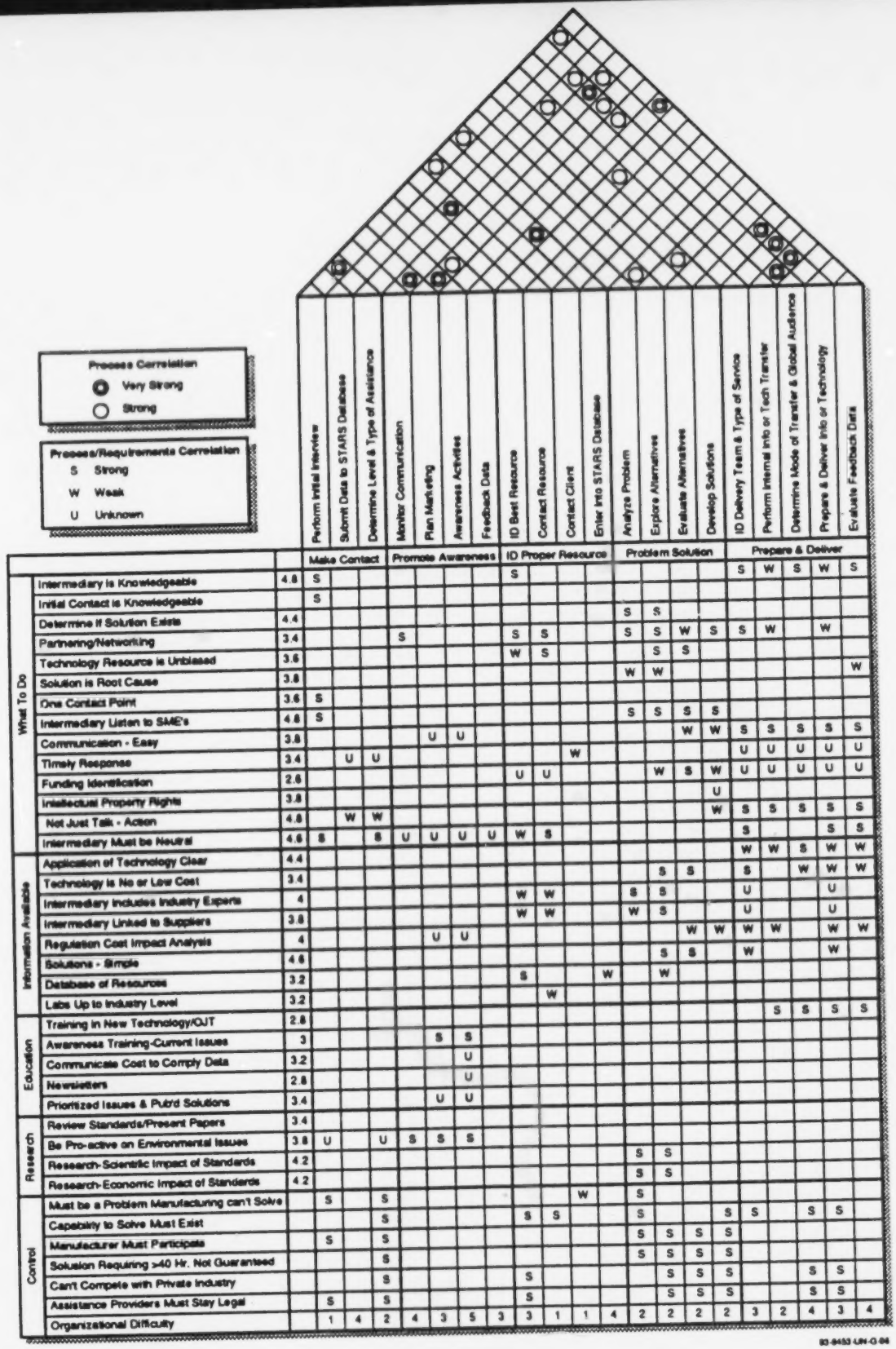

Figure 2-3.

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3.1 TECHNOLOGY TRANSFER PROCESS MODEL DISCUSSION

The purpose of the model was to identify the process steps required to provide for a successful resolution of a client's request for information, technology, or problem assistance. It is assumed the client will contact an assistance provider, such as the Small Business Development Center (SBDC), a Cooperative Extension Service agent, the Manufacturing Productivity Center, Economic Development, etc. It is further assumed the client does not have the internal capability to solve his/her own problem or find the needed information or technology. The client assumes that the assistance provider can either supply the solution or can help the client contact the appropriate resources.

The model describes five major activities in this process. They are:

- **Make Initial Contact**
  The client requests help from an assistance provider.
- **Identify Proper Resource or Expert**
  The assistance provider determines where the client can receive the best solution to his/her need.
- **Find the Problem Solution**
  This may range from just providing the needed information or going through a process of identifying alternative solutions and determining that solution which best fits the client.
- **Prepare and Deliver the Service/ Assistance**
  This requires putting the knowledge, information, or technology into a format that is useful to the client. It may require modification of the technology, development of training packages, etc.
- **Promote Technology Availability Awareness**
  This is the outreach part of the process; it is an admission that even though there is wonderful technology available to help make any business owner or manufacturer more successful and profitable, unless he/she knows what is available and how to access it, it is worthless. This step recognizes that to reach out to the business community to make them aware of the services that are available is an ongoing marketing and sales activity. The Working Group felt that this step in the technology transfer process was often overlooked and needed to be emphasized.

These five basic activities are illustrated in the model in Figure 3-1. The inputs and outputs are detailed in the model, but the controls and mechanisms have been omitted for clarity. (Refer to Appendix B for the complete diagram.)

It is important to note that there are some very critical aspects to this model which, if not included in practice, will prevent its effectiveness. The input into the "Make Initial Contact" and "Identify Proper Resource or Expert" activities labeled "Intermediary Staff Training" must provide the staff with the skills to conduct effective interviews and the knowledge to determine the best resources to bring to the client. This training is not a one-time exercise; it must be continuous and must be a part of the assistance providers' budget of time and money.

Another key aspect of the model is that the client is involved throughout the technology transfer process, including the problem solution and determining the best mode of information/technology transfer. This aspect emphasizes that this is a client- or customer-centered model.

NODE: A0

Perform Intermediary Function

CONTEXT:

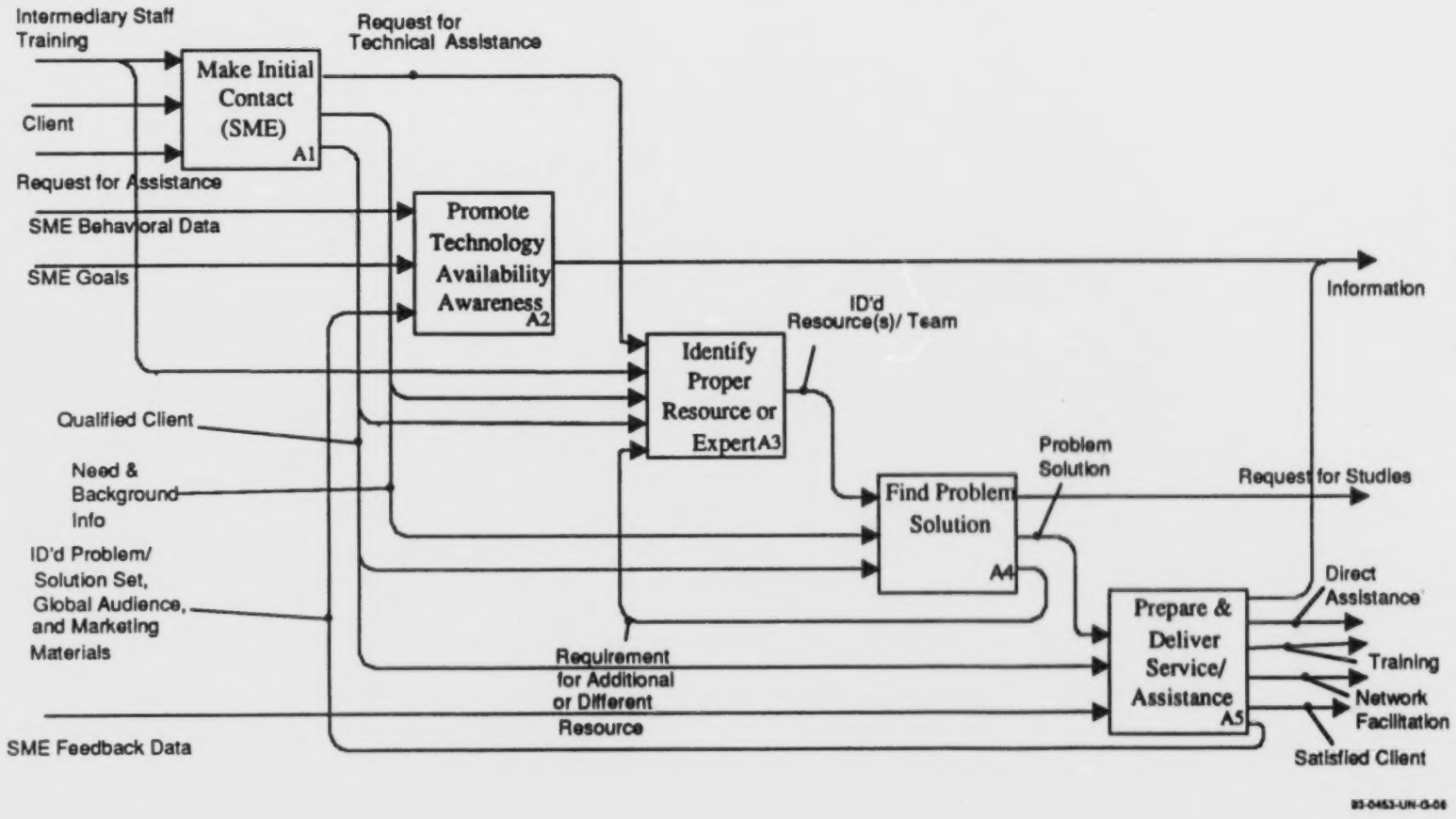

Figure 3-1.

Figure 3-2 provides further detail on the Make Initial Contact activity. The output of the initial interview is submitted to the assistance providers network database. In New Mexico it is the State Technology Assistance Resource System (STARS) that fills this role. Once fully implemented, the heart of the STARS network will be its Automated Client Management System (ACMS). The STARS network is an example of how the system integration for statewide assistance providers can work. When implemented as described in the model, it will provide an easy-to-use communication system to receive and provide information on clients. The STARS and other similar types of network systems will provide the following benefits for participating assistance providers:

- Permit the initial assistance organization to enter client intake information directly into the system and allow any organization to update that information as needed.
- Allow network staff to easily schedule, track, and coordinate each client's progress through the network by prompting the next client contact.
- Provide an easy-to-use E-mail system linking all of the assistance organizations in the network.
- Automate a system for documenting, over time, the economic impact of services provided through the network.
- Automate the reporting of client feedback on quality issues.
- Analyze and document the usage, usage patterns, and effectiveness of the overall network.

A well staffed, electronic-based network will provide the following for each assistance provider in the network:

- Accurate and current (near real-time) client information.
- A fast, easy way to update and add to that information.
- An ability to track the status of services other organizations have provided and/or are providing to clients.
- Timely feedback from clients regarding the quality of the services received.
- Documentation of the economic impact that assistance is having.
- Ability to track industry wide problems.

An electronic network combines the advantages of a centralized data collection system and distributed client referral system. Each member of the network may still make their own referrals when appropriate, but it will be easier and faster to request a referral through the network when it is unclear to the provider where a particular client should be referred. Assistance providers around the state will also have the benefit of:

- Allowing participants to leverage their own small business assistance capabilities with those of other network members.
- Allowing participants to use network services to document and report the economic impact of the services they provide in a standardized manner.

As one examines the model, it can be seen client feedback and measurement of results is a very important part of the model. The capability of continuous improvement in the assistance providers system in New Mexico will only be possible by establishing metrics and capturing and analyzing the data on those metrics.

In the flow of events in providing assistance, Node A3 is the next step of the process. Node A2

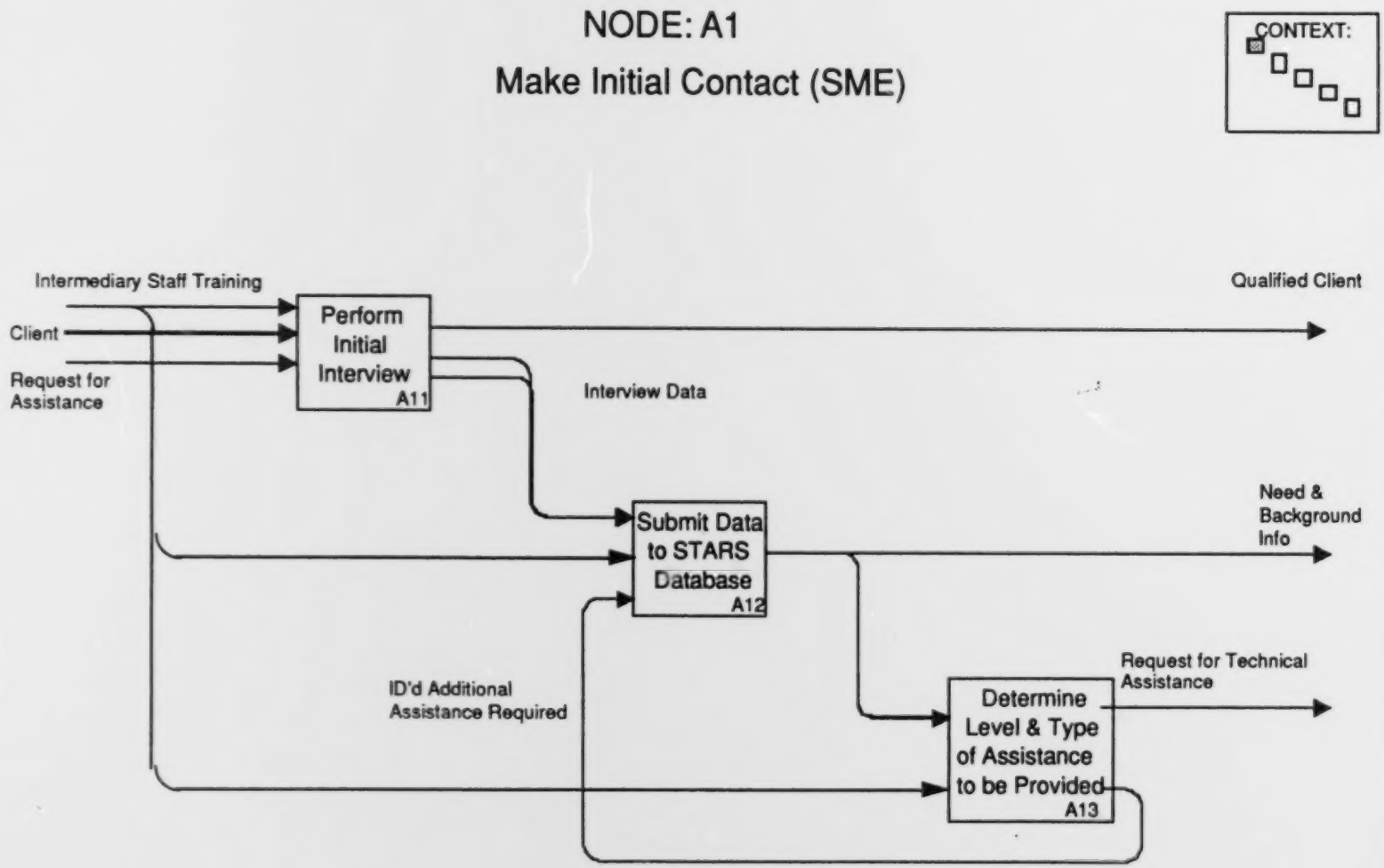
NODE: A1
Make Initial Contact (SME)
CONTEXT:
Intermediary Staff Training
Client
Request for Assistance
Perform Initial Interview
A11
Qualified Client
Interview Data
Submit Data to STARS Database
A12
Need & Background Info
ID'd Additional Assistance Required
Determine Level & Type of Assistance to be Provided
A13
Request for Technical Assistance

Figure 3-2.

is the outreach activity and will be taken up last in the discussion. Figure 3-3 illustrates the "Identify Proper Resource or Expert" activity. After the identification of the client's problem, the primary contact will either identify resources based on their own experience with similar problem solutions, turn the client over to a network, such as STARS, or work through the network to develop a list of potential resources. The resource (such as a national lab, a community college, etc.) is contacted, the problem is explained, and the resource is asked if they have the expertise and the time to assist the client. If they agree to help, they are given the client's name and phone number and asked to contact the client and set up a meeting. During the initial meeting between the client and the resource/expert, the assistance provider may or may not be present. During this meeting, both the client and the resource will come to common agreement as to the nature of the problem, the requirements for a solution, and the expectations of both parties with respect to their role in finding and implementing a solution. Because it is impossible to train every resource or expert, it is wise for a trained assistance provider to coordinate this meeting to ensure that all parties leave the meeting with complete agreement and understanding of roles and expected outcomes.

One must understand that not all of these steps will be necessary in every case. Some problems are simple enough for assistance providers to provide the information immediately or with a phone call to the recommended information resource. Or the assistance provider may have the capability to provide the technical assistance, in which case he/she becomes both the assistance provider/intermediary and the resource/expert.

NODE: A3

Identify Proper Resource or Expert

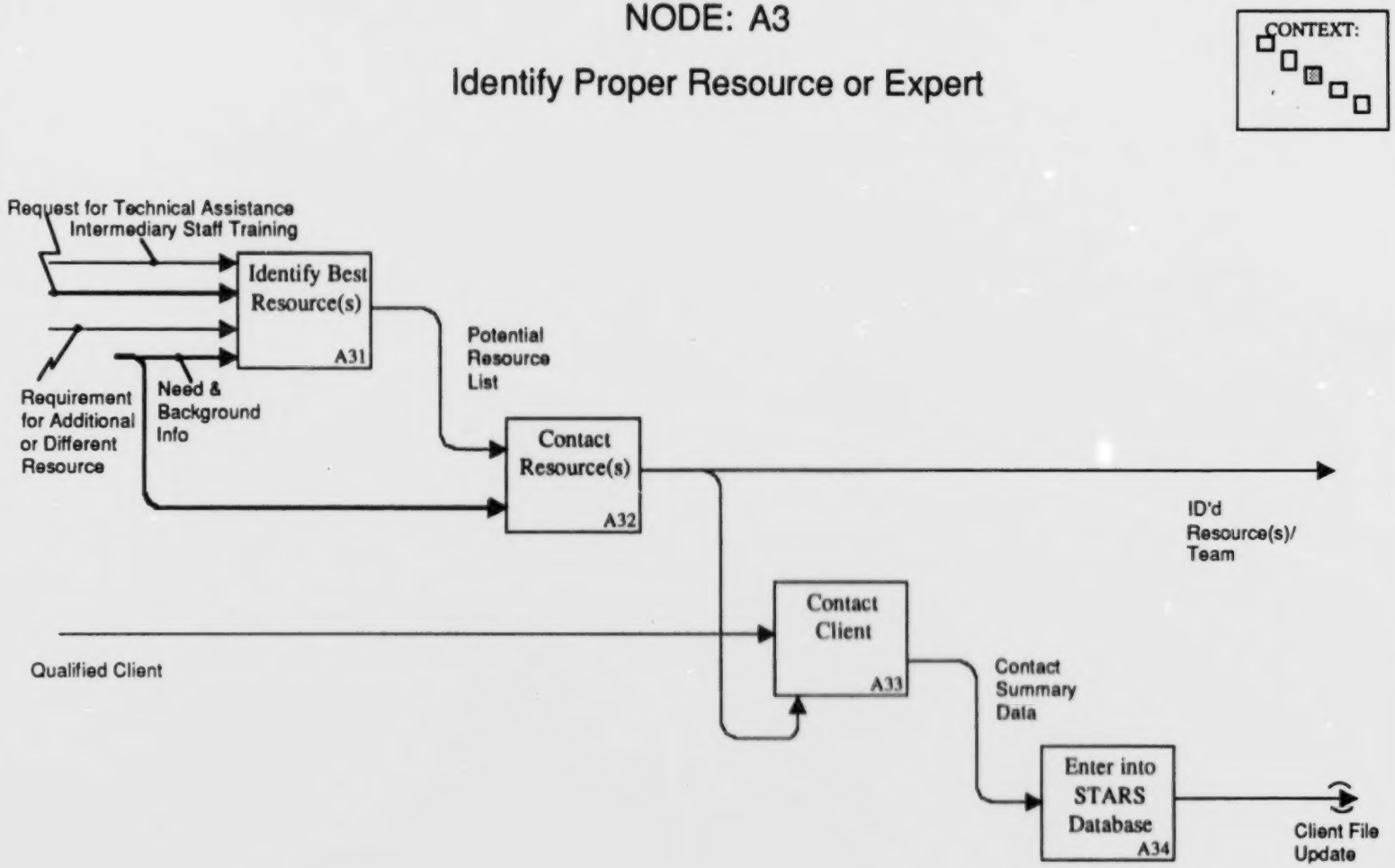

Figure 3-3.

The next step, as illustrated in Figure 3-4, is to Find the Problem Solution. As explained above, not every case will go through all of the steps indicated in the figure. Sometimes the resource/ expert has been through similar scenarios and has already discovered a well thought-out solution. However, for those cases that appear unique to the client and do not have a ready-made solution, the indicated procedure represents a traditional problem-solving process. After analyzing the problem, the client becomes a participant in the resolution. Consequently, he/she must become a partner in determining the best solution.

NODE: A4

Find Problem Solution

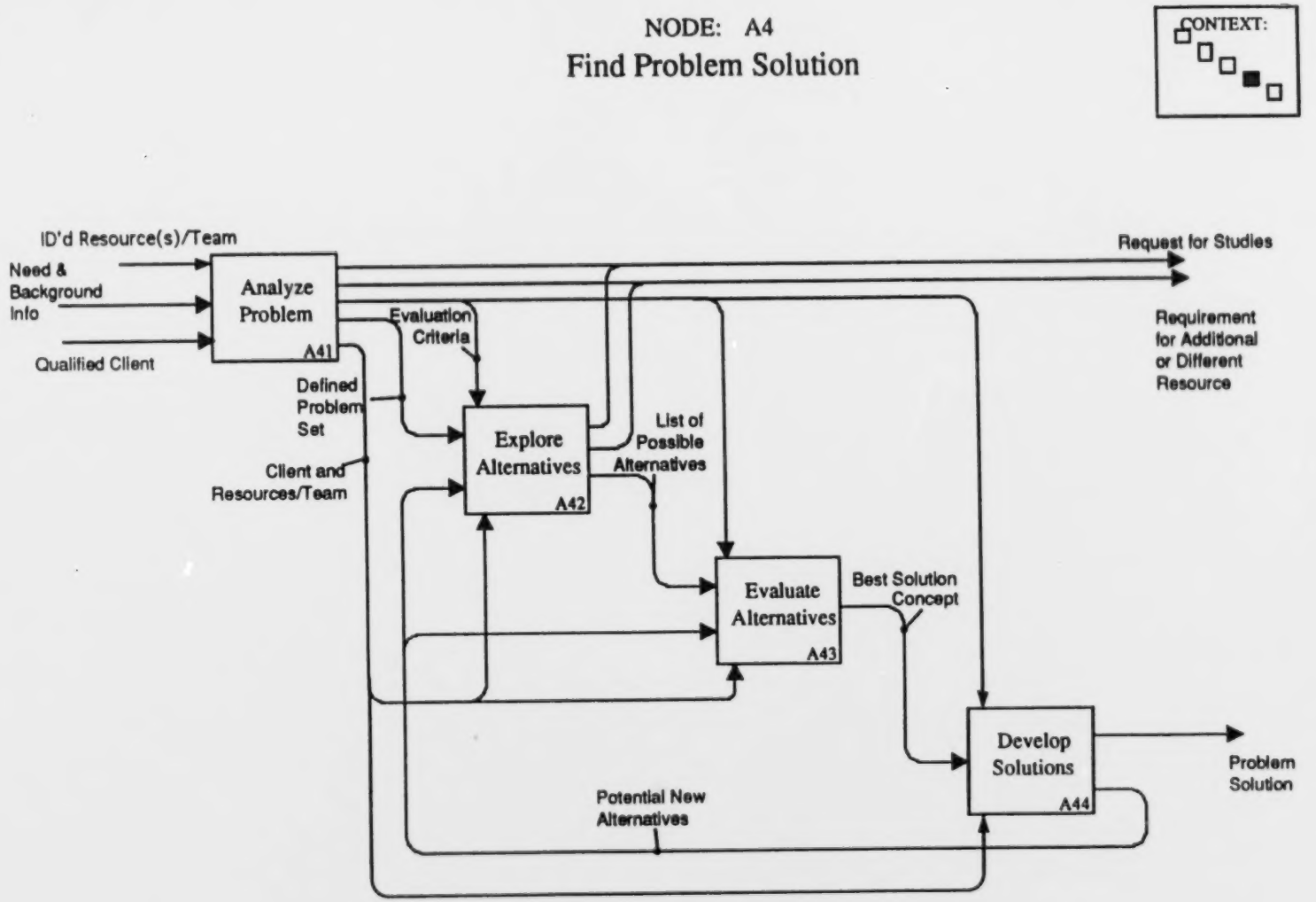

Figure 3-4.

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Node A5 (illustrated in Figure 3-5) assumes the possibility of a multi-faceted, complex problem solution that may involve technology from a national laboratory, modifications by an applications engineer, or financing and training. These entities would be identified as the "Delivery Team," and the expertise they provide would be the "Type of Service." Staff from the electronic network service would be in the position of the project manager as needed. In this scenario, the national lab scientist/engineer would have to transfer the basic technology to an engineer (such as a Manufacturing Productivity Center field engineer), who would then be able to modify it for use by the client. The training personnel (such as community college staff) would teach the client's personnel how to use it. This is what the model refers to as "Internal Information of Technology Transfer."

A properly staffed electronic network system will help identify numerous requests for similar types of service. In cases where there is no proprietary information or technology or intellectual property rights issues, the Delivery Team may consider making the problem solution available to everyone. Node A53 (Figure 3-5) provides the opportunity to identify a global audience for mass information or technology transfer. This may have a profound effect on the mechanism for delivering the information or technology to the general business community. The last step identified in the figure is critical: Evaluate the Feedback Data. Without this step, the assistance providers will never know how well they are meeting the needs of their customers.

NODE: A5

Prepare & Deliver Service/ Assistance

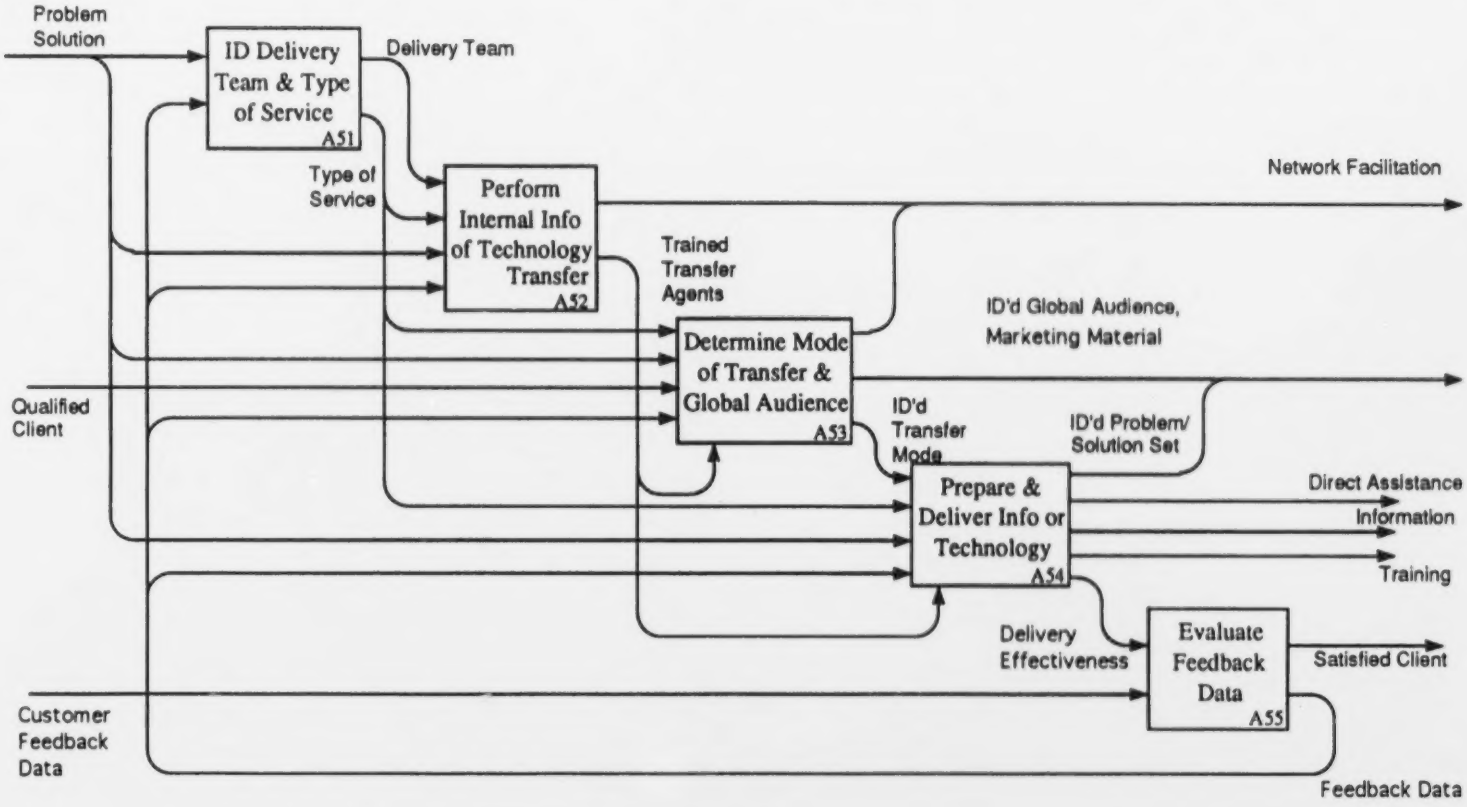

Figure 3-5.

Node A2, "Promote Technology Availability Awareness," is key to industrial modernization and continuous improvement. It cannot be assumed that, even with the best designed service possible, business will seek the assistance providers. In fact, the survey conducted by the Working Group showed many business owners do not consider the Laboratories or Community Colleges as resources for assistance. Consequently, there must be a well-coordinated outreach program that provides the information to the business community in a well-designed, easily assimilated format.

Business owners are hardworking, busy individuals who are inundated with information that is often irrelevant to their interests. Hence, the assistance providers network and capabilities must rise above the "noise" of the general marketplace by achieving a well thought-out, carefully designed marketing program. Figure 3-6 illustrates this process. The first step is to determine the modes of communication and the issues facing within a specific industry and geographical context. Some industries have strong associations; others do not. Some industries are linked through a vendor of common materials or a common customer. Some manufacturers meet through a strong Chamber of Commerce. For each industry or geographical area, this communication network must be identified and used as a major part of the marketing plan. A network such as STARS can provide the coordination between specific industry, local, state, and national technology opportunities awareness efforts.

Again, a very critical part of the marketing effort is to gather feedback to determine the effectiveness of the various activities. In New Mexico, this will be coordinated through STARS.

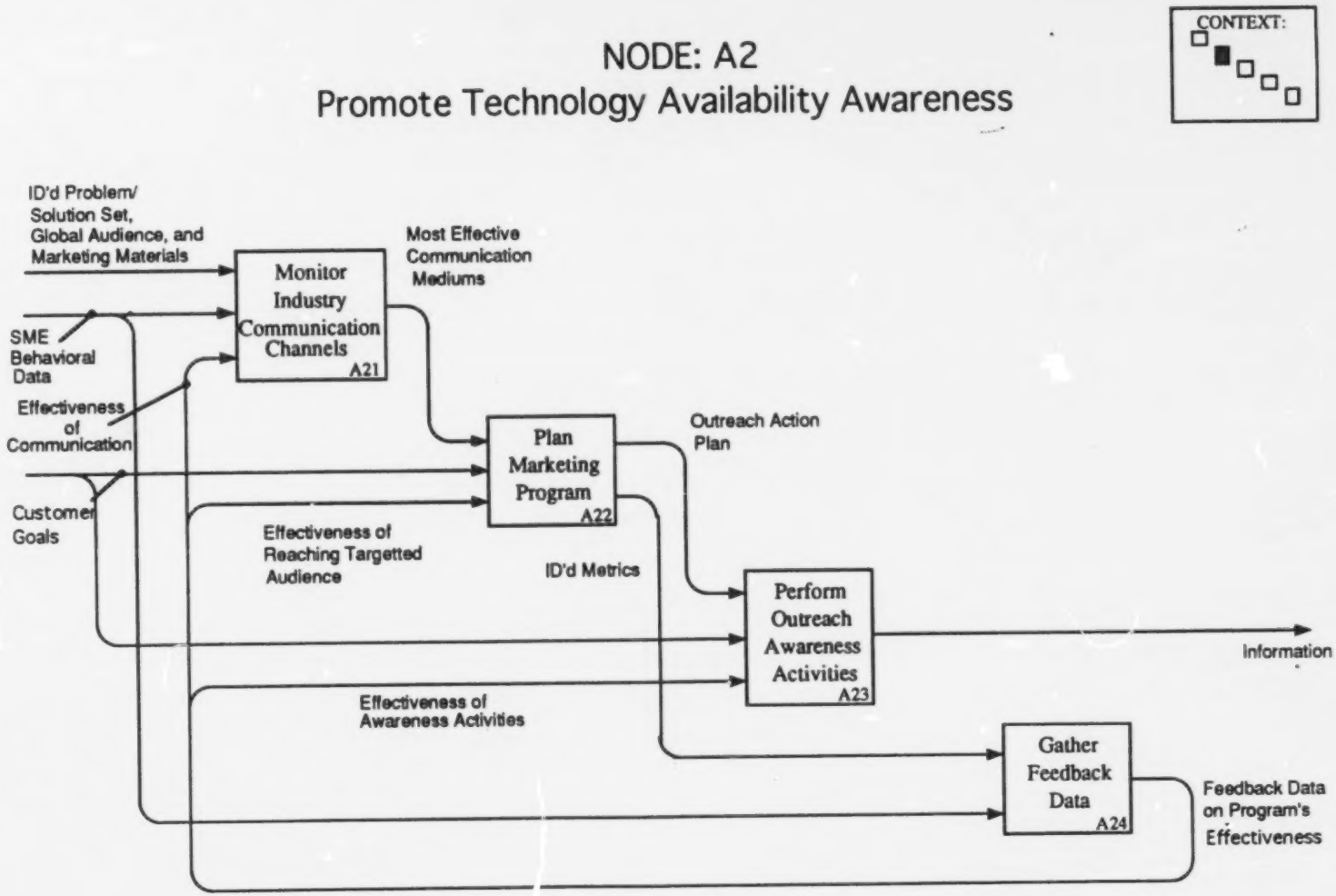

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Figure 3-6.

SECTION 4
CONCLUSIONS

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT³I) program, sponsored by the United States Department of Energy, Office of Environmental Restoration and Waste Management and executed through Sandia National Laboratories, is charged with the task of performing an analysis of the problems of transferring environmental technologies from the DOE laboratories to small and medium enterprises (SME). After completion of the study and the development of the model, the Working Group came to the following conclusions:

Conclusion 1

The ECMT³I model is client, not technology or organization, centered. The development of the model started with an investigation of the clients' needs and concerns. Many discussions were held with small business owners, both individually and in groups, for the purpose of specifying the characteristics of an intermediary who would meet the communication requirements of the small and medium business. These "Customer Requirements" were used to verify the process of providing assistance to the business/manufacturing community.

Impact

Treating the SME as a customer will provide the following results: (1) The assistance providers will develop marketing plans based on knowledge of the customer, (2) The technology transfer effort will be conducted based on the SME's needs, (3) Progress in providing assistance and information will be measured and tracked, and (4) Increase success rate of technology transfer.

Conclusion 2

The New Mexico assistance providers must be networked. Through the use of a system such as the STARS Automated Client Management System, the New Mexico assistance providers will be electronically integrated to provide communication and tracking capability to provide the client with the most comprehensive service possible.

Impact

With assistance providers networked the SMEs will receive: (1) Faster service when teaming of more than one assistance provider is required or when another resource is sought, (2) Less trial and error, as assistance providers can research solutions to similar problems, (3) Less chance of "falling through the crack," as their progress is tracked, and (4) More complete access to New Mexico's technology base. The assistance provider will benefit by having: (1) Faster access to other assistance providers and sources of technology and information within the state, (2) Summary reports on their

clients as needed, (3) Progress reports on the overall effects of the assistance provider network on economic development in the state, (4) Identification of SMEs who have entered the assistance network at other points and results of the help provided, and (5) Ability to track industry-wide problems.

Conclusion 3

In order to gain full advantage of the electronic network service, the system must add value to the assistance providers. In exchange for providing information on their projects to the database, assistance providers will be able to print out summary reports for their own accountability reporting, track involvement of other resources in the process, and retrieve feedback from the client on the results of the assistance.

Impact

See impact under Conclusion 2

Conclusion 4

The electronic network service will provide the capability for metrics, measurement, and analysis. To determine the quality of the assistance provided, a method of measurement must be determined and metrics defined that will reflect real improvements in the SME's operation as a result of the assistance provided. The network service's role in this process is to obtain this data and provide it in a format that is useful to the client and the assistance provider.

Impact

Most assistance providers and sources of technology are responsible to some government agency, legislature or congress to secure funding. The metrics and summary reporting capability of a central integrator will enhance the success of their individual program. In addition, the metrics can be used by assistance providers as a tool for continuous improvement of services and as a benchmarking tool with other providers around the state. Long-term tracking will help prioritize those industries that benefit the most from direct assistance and will provide economic developers with data to support their program thrusts.

Conclusion 5

The model includes training for SMEs as a critical component for successful technology transfer. Introduction of any new process technology inherently requires a training component. This often ignored component of technology transfer is firmly imbedded in the ECMT³I model. At this point, a team is established to determine the feasibility of addressing the issue and its solution with a proactive training program.

Impact

Training with respect to using technology will: (1) Ensure success of transfer of technology, (2) Empower workers to diagnose, maintain, and expand use of technology, (3) Transfer learning to other job skills, and (4) Enhance quality of New Mexico's workforce.

Conclusion 6

Training of the assistance provider's staff is required to provide maximum service to the SMEs.

Impact

Training is the essential ingredient to ensure that the computer network will be used to its fullest capability. Training on interview techniques will make assistance providers better able to identify critical information and to identify the root causes of client problems as opposed to symptoms. Training with respect to managing clients' expectations will ensure both the client and the provider understand and communicate what can and cannot be done. Project management training will assist providers in tracking large projects and completing them on-time. Training on where sources of technology, information and training exist will make assistance providers better counselors and more responsive to their clients' needs.

Conclusion 7

The model assumes service capability must be marketed and sold. Even with the best program or product available, the capability to help small business solve problems, locate information, or assist them in procuring and using technology must be widely advertised to the business and manufacturing sectors.

Impact

SMEs will be provided with a more efficient and effective communication channel for exploring options to their problems and for assessing potential difficulties. Better marketing will make the business owner aware of potential problems, solutions to those problems, and new opportunities to improve his business.

APPENDIX A
IDEF MODEL

A.1 AN IDEF TUTORIAL

IDEF-Zero Model

A major advantage of activity modeling is that it forces the analyst to think through a system or set of operations and to analyze how the pieces of the puzzle fit together to make a whole process work for Strategic Business Planning.

The IDEF activity modeling is an organized sequence of diagrams that describes in sequential, "telescopic" detail, the work activities being performed. IDEF-Zero diagrams graphically present elements or activities and their relationships. The following examples illustrate how to read a basic IDEF-Zero diagram. Figure A-1 addresses the basic syntax and configuration.

A box represents the *activity* to be performed or an input that is transformed and results in an output that is different from the input, a value-added transition. **Arrows**, representing *objects* or *information* required or produced by the activity, enter or leave the box. The arrows are constraints that define the boxes, not sequences or process flows. The side of a box where an arrow enters or leaves reflects its role as an *input, control, output* or *mechanism*.

Inputs (always on the left) are changed into **outputs** (always on the right) after the activity is performed. **Controls** (always on the top) describe the conditions and circumstances that govern the way the change is accomplished. Controls might be policies, requirements, demands, constraints, etc. Every activity box should have at least one control arrow. **Mechanisms** (always on the bottom) indicate the resource required to perform the activity. Mechanisms can also be referred to as the means used to transform or add value to inputs for outputs. Mechanisms might be employees with specific skills, facilities, machines, etc.

Figure A-2 illustrates the way an activity is "decomposed" into more detailed subactivities. Each box in a parent diagram may be decomposed into a set of child diagrams.

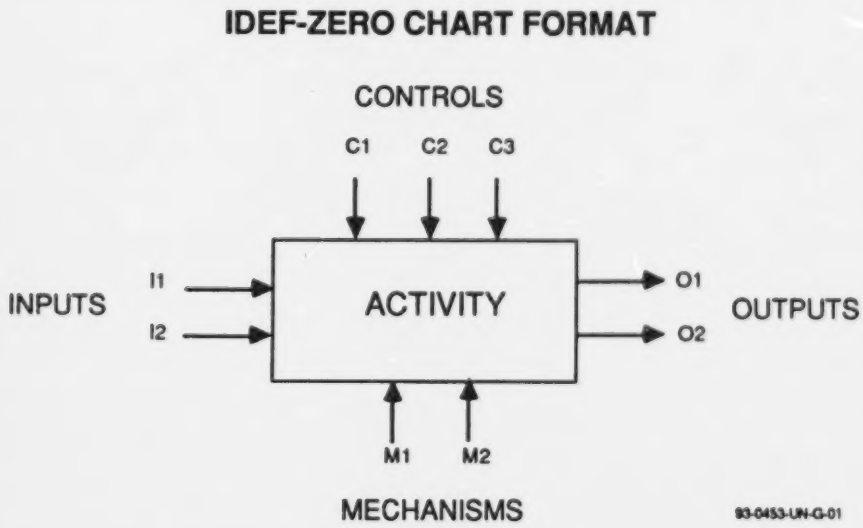


Figure A-1. Basic Syntax and Configuration

The following is an application of the elements described above to a specific activity such as "Make a Chair." Figure A-3 is a simple illustration of this activity using IDEF terminology and methodology.

Assume that the inputs for building this chair consist of materials and information. While the outputs are the finished chair, scrap material and information about

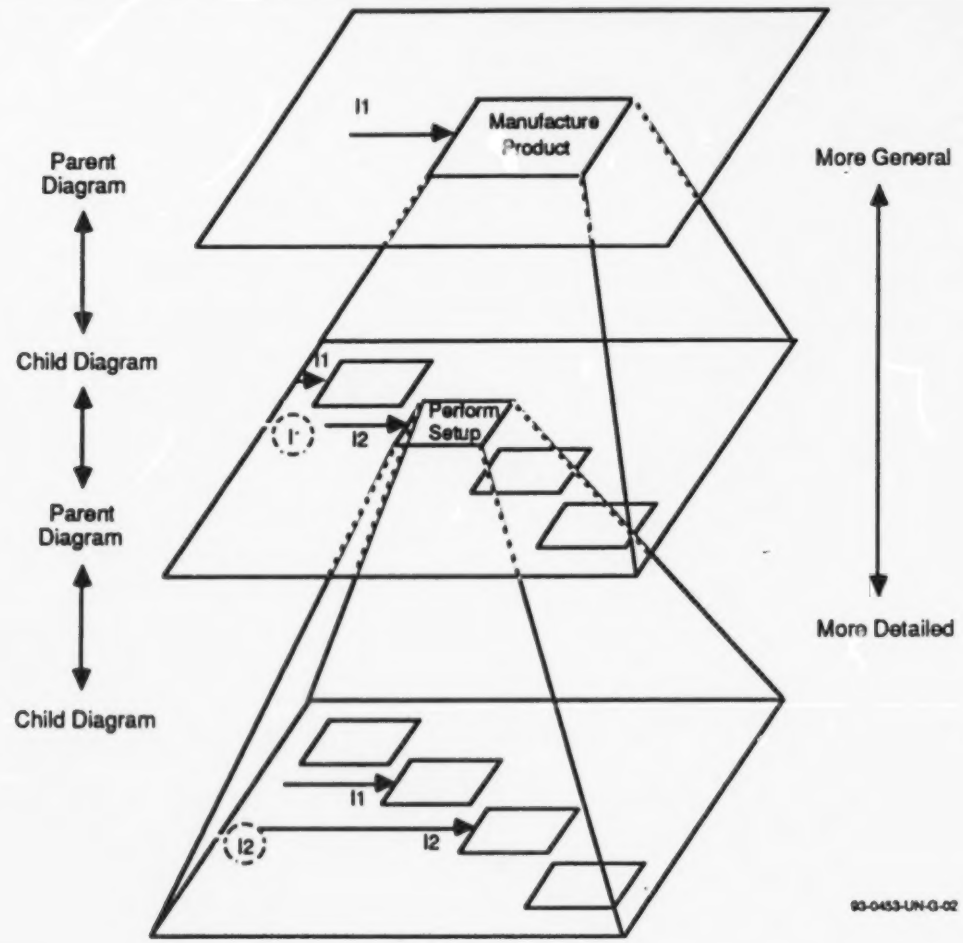


Figure A-2. IDEF Decomposition Relationships

the finished chair are also outputs. The control is a descriptive request and the mechanisms are the builder's skills and tools.

A decomposition of this activity is reflected in Figure A-4, commonly referred to as a child diagram. The child diagram expands the parent diagram into three activity descriptions consisting of "Establish Design," "Obtain Materials," and "Build Chair." Additional relationship detail is added to the child that further enhances understanding of the relationships of individual activities. Additional detail could be provided for this example by a further decomposition of each box in the child diagram.

In summary, this section has provided a brief introduction of how the activity modeling architecture is developed to help establish a graphical snapshot of operations that serve as a basis and framework for understanding and analysis. The IDEF architecture, when used correctly, becomes a road map that helps to highlight those improvement opportunities that merit attention while at

IDEF-ZERO CHART EXAMPLE

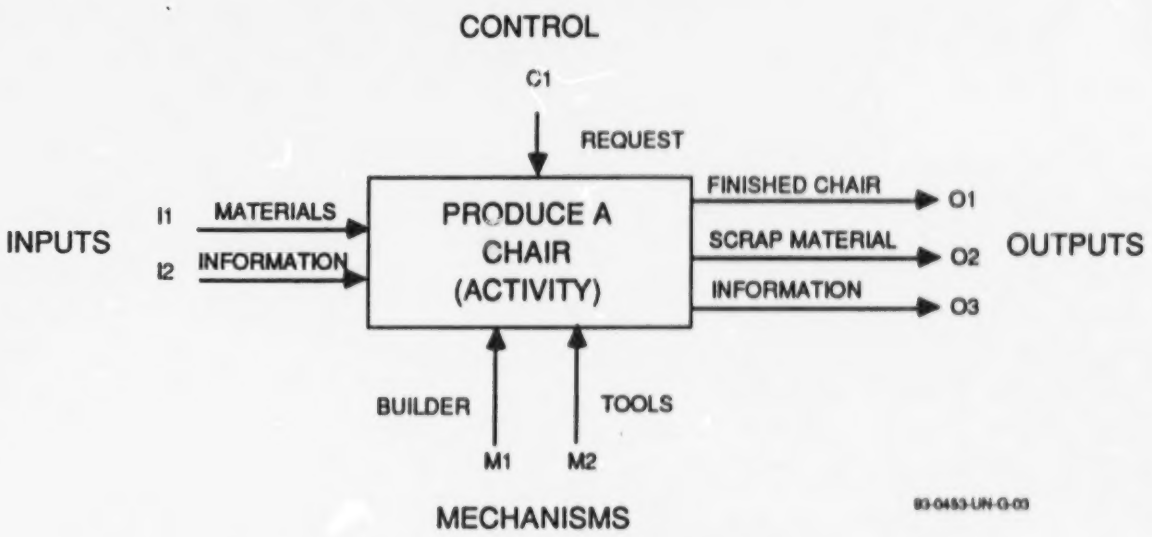


Figure A-3. Activity to Produce a Chair

IDEF-ZERO CHART EXAMPLE (CHILD)

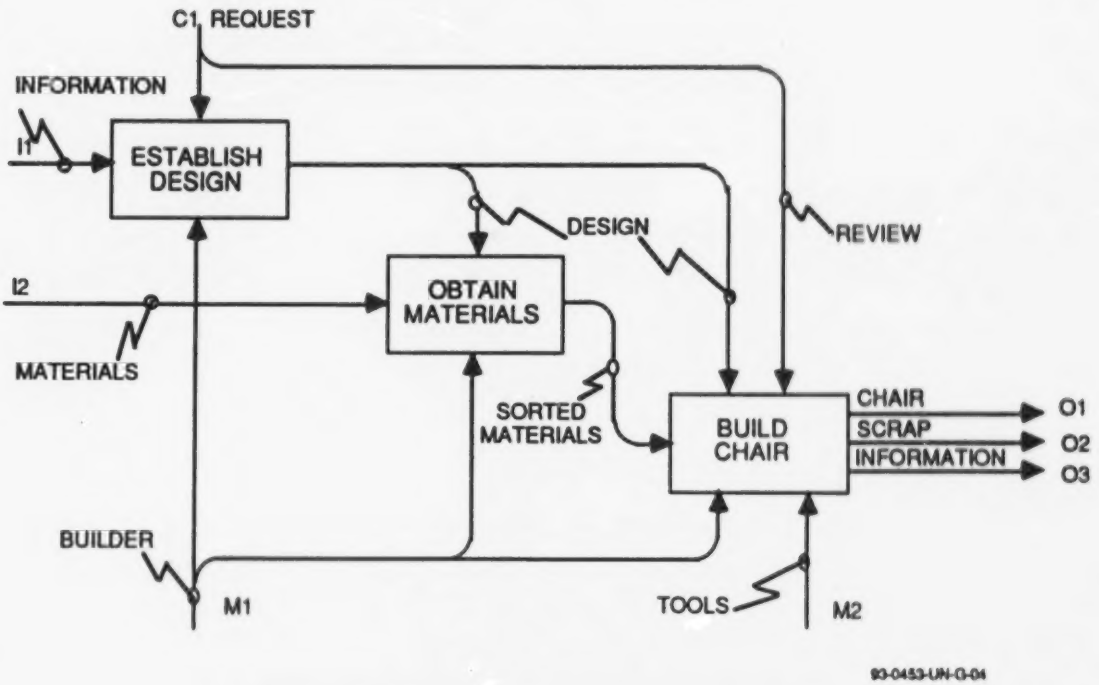


Figure A-4. Produce a Chair Decomposition

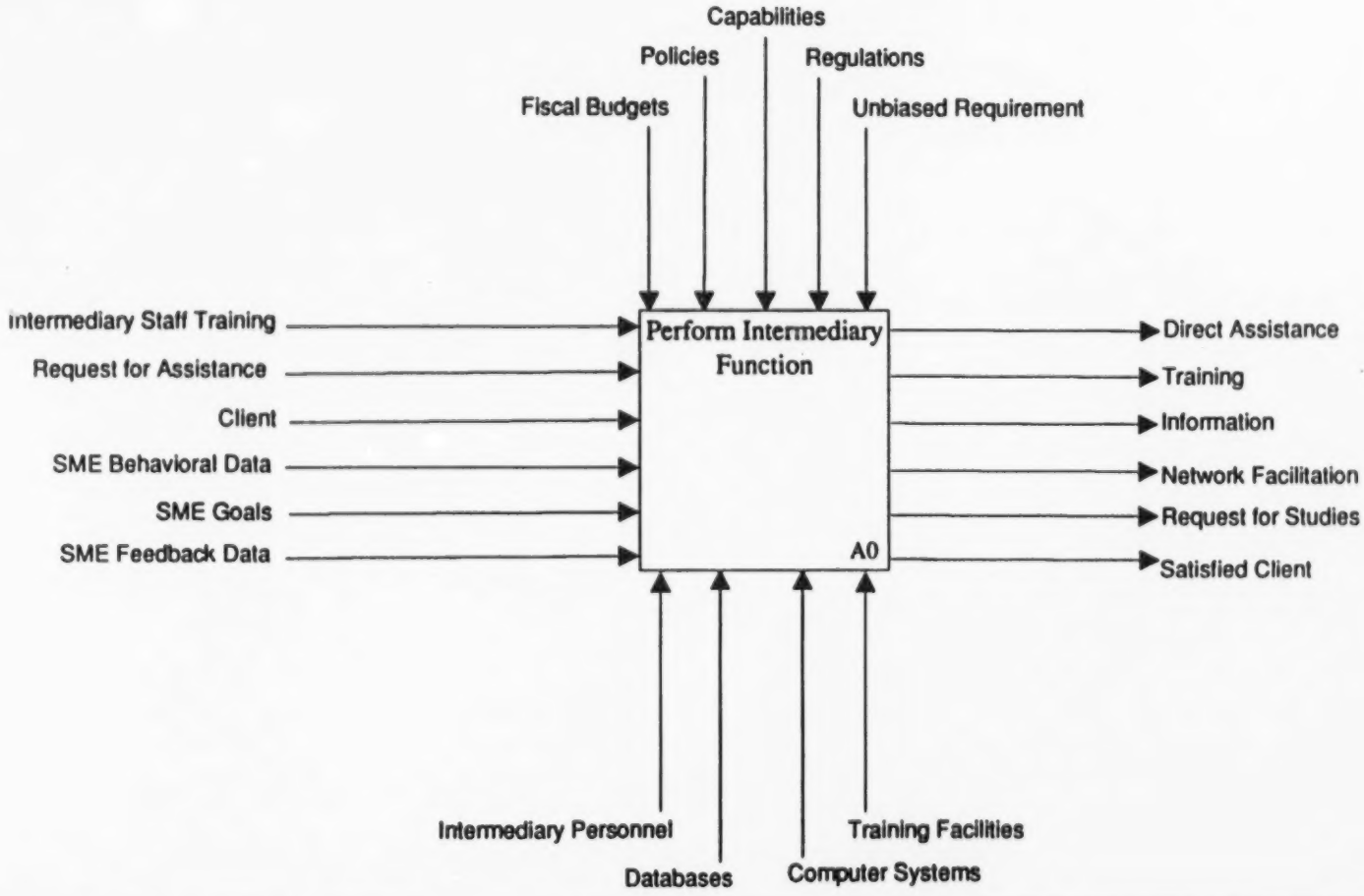
the same time maintaining sufficient flexibility to adapt to any given product/service situation.

A.2 BUILDING A MODEL THE CONSENSUS WAY

Members of the Working Group developed the model in working sessions. After preliminary concepts were outlined, the model was diagrammed and formalized. The next session started with a review and critique of the formal model. Definitions of all activities, inputs, outputs, controls, and mechanisms were developed and reviewed by the group.

APPENDIX B
NEW MEXICO TECHNOLOGY TRANSFER PROCESS MODEL

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 4/13/93 REV: 2 6/8/93	WORKING	READER DATE	CONTEXT:
			DRAFT		Top
			RECOMMENDED		
			PUBLICATION		



NODE: A-0	TITLE: Perform Intermediary Function	NUMBER: 52

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 4/13/93		WORKING	READER DATE	CONTEXT:
A-0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		TEXT
				PUBLICATION		

Perform Intermediary Function: An Intermediary is any organization which provides assistance to manufacturers in helping them solve business and technical problems. The Intermediary may or may not have the technology, information or problem solution within its organization, but does have access to other organizations that can provide the assistance. These other organizations may be other Intermediaries or may be the source of technology, information, or problem solution.

INPUTS:

Intermediary Staff Training: To perform the Intermediary function, the Intermediary's staff must be knowledgable about manufacturing in general, new manufacturing technologies and practices, and sources of assistance. To meet the SME's needs, these staff members must also be able to use computer and communication equipment to be effective. The training is to keep the staff up to a high level of competency.

Request for Assistance: This may come directly from the SME or may come from another Intermediary

Client: A client is anyone who enters the system seeking assistance for information or a solution to a problem. The client may enter the system at any point, i.e. through any of the many assistance providers or sources of technology. The client may be serviced and leave the system or may be directed to other assistance providers for further help.

SME Behavioral Data: A major activity for the "Perform Intermediary Function" is raising the level of awareness of the SME with respect to the environment, their manufacturing operations impact on the environment, environmental regulations, the health and safety of their employees, the use of technology and training to improve their operation, and the availability of assistance to solve their environmental compliance problems. If this awareness activity is effective then there should be behavior changes by the SME's. These behavior changes may be represented by an increase in requests for assistance, higher levels of attendance at training seminars, a decrease in compliance problems with city, state, and federal regulators, etc.

SME Goals: The SME Goals are the expected outcomes of the request for assistance. These goals will not only drive the assistance process but will form the basis for evaluation of the effectiveness of the assistance.

SME Feedback Data: The SME will be asked to evaluate the effectiveness of the response to his/her request and how that response has effected his/her business. In some cases, evaluations will be both short term and long term.

NODE: Text	TITLE: Perform Intermediary Function	NUMBER: Page 1

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 4/13/93		WORKING	READER DATE	CONTEXT:
	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		
A-0				RECOMMENDED		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			PUBLICATION		

OUTPUTS:

Direct Assistance: This is the direct help that the Intermediary or technical resource provides to the SME.

Training: This is training provided to other Intermediaries and to SME's directly by the Intermediaries themselves. This includes the curriculum and the materials for instruction.

Direct Assistance: This is the direct help that the Intermediary provides to the SME.

Information: This includes any information provided to SME's. The information may be verbal, written, or electronic.

Network Facilitation: This includes facilitation of the organization of industry groups, trade groups, business associations, flexible manufacturing networks, etc. The role of the Intermediary is to bring the interested parties together, help them organize, and help provide resources to meet their goals and objectives.

Request for Studies: The Intermediaries will make requests to the Federal Labs, Universities, etc. for studies on the cost impact of regulations, the scientific impact of standards and the economic impact of standards. The regulation cost impacts analyses will define and communicate cost issues and the cost of compliance. Scientific impact of standards will be based on the performance of unbiased research into the effects of varying levels of contaminants on biological and geological systems. This research would not specifically support any one view, but would present only research facts. The economic impact of standards would be based on the performance of research into the effects of varying levels of contaminants on social and economic systems.

Satisfied Client: One who has had his/her request satisfied in a timely manner and with knowledgeable (practical) information or solutions.

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 4/13/93		WORKING	READER DATE	CONTEXT:
A-0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

MECHANISMS:

Intermediary Personnel: This includes all personnel of each Intermediary organization. The Intermediary staff must have the knowledge to understand the SME's processes well enough to be able to answer questions and to understand possible variations on the technology. In some cases the staff must learn the technology from the source in order to transfer it to the SME.

Databases: The Intermediaries must be able to access, and in some cases create, several databases. The number of available databases which they will be required to access will grow over time. Someone in the Intermediary "pool" (Possibly Technet) must create and maintain a database of available resources and a database of solution summaries. An example of an outside database that they will access is Teltech.

Specifically, the Intermediaries must have access to: (1) Info on Resources: They must have up-to-date information on all resources available (and their constraints) to provide assistance to their SME clients The requirement is that this information must be current, readily available and quick. (2) Solution Summary: This summary will take several forms and be used in many ways. (1) Problem solution summaries will be kept in a database so that subsequent requests for similar help can be quickly routed to the solution source. Also, as requests for similar help come in, needs for industry-wide training can be evaluated. (2) Upon initial inquiry, a database of solution summaries will tell the Intermediary if a solution to his problem already exists. (3) Info on Standards/Regulations: The Intermediary must have an easily accessable database of EPA & OSHA regulations to be able to intelligently answer SME's questions and issues. (4) Emerging Technologies, state-of-the-art, and Manufacturing Best Practices databases: A series of databases that will provide the Assistance provider with information on a wide range of solutions, both emerging and current best practices, for the client's problem.

Computer Systems: The Intermediaries must have the capability to communicate via modem with other Intermediaries and technology sources and must have the capability to interface with a variety of databases

Training Facilities: This includes the two year schools and universities facilities as well as Intermediary's own training facilities. In some cases private enterprise or the labs may also provide training facilities.

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 5/3/93		WORKING	READER DATE	CONTEXT:
	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
A-0		6/8/93		RECOMMENDED		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			PUBLICATION		

CONTROLS/CONSTRAINTS:

Fiscal Budgets: Most of the Intermediaries and sources of technology operate on government funds, which are limited. Limited budgets act as a constraining factor for some solutions and some research studies. Another separate item in Fiscal Budgets is that of the client and their ability to obtain capital to solve the problem.

Policies: Not all clients who enter the system will be serviced. A set of criteria for eligible clients will be established and clients entering the system must meet these requirements in order to receive assistance. In addition, because most Intermediaries and sources of technology are government funded, the sponsoring agencies have guidelines structuring the type of projects and the extent of the involvement that is allowed in working with the SME's. These policies will limit the types of problems that they can handle.

Capabilities: The capabilities of the Intermediaries and the sources of technology limit the types of problems that can be successfully dealt with.

Regulations: OSHA & EPA regulations limit some of the solutions for both the SME's and the sources of technology

Unbiased Requirement: The SME's want as unbiased a set of resources to perform studies and provide information and assistance as possible. This is especially important with respect to studies, i.e., results should not paint a pro EPA/OSHA or pro business viewpoint. In the case of a problem solutions , the requirement is that it not lean heavily on a solution that favors one particular commercial company.

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 4/19/93		WORKING	READER DATE	CONTEXT:
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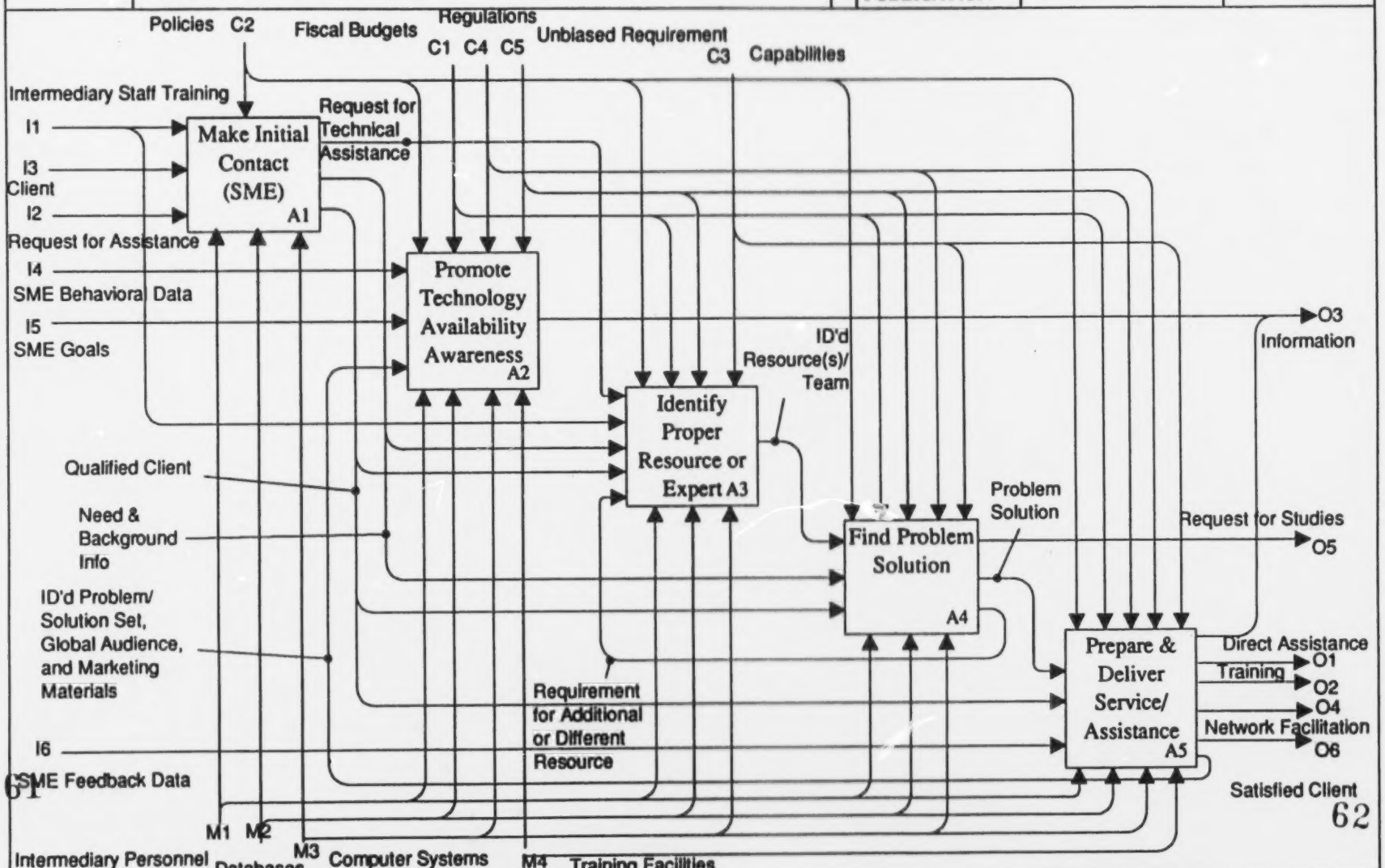
				RECOMMENDED		
	NOTES: 1 2 3 4 5 6 7 8 9 10			PUBLICATION		



NODE: A0	TITLE: Perform Intermediary Function	NUMBER:

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 5/6/93		WORKING	READER DATE	CONTEXT:
A0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A1 - Make Initial Contact (SME)

This refers to the first time an SME seeks assistance from any assistance provider. This includes cases where an assistance provider contacts the SME, makes him aware of an issue and asks if he needs help addressing the issue. (The assistance provider is being pro-active in this case.) The SME will be interviewed to determine if his company and his problem meet certain criteria to qualify him for assistance. The criteria are based on the requester having a legal, bonified business; that the request is for services to solve problems using existing resources; and that the services requested are legal. During the interview, the Intermediary, or assistance provider, will formulate a clear understanding of the problem and determine what resources are required to solve it.

INPUTS:

Intermediary Staff Training: (See A-0)

Client: (See A-0)

Request for Assistance: (See A-0)

OUTPUTS:

Request for Technical Assistance: If the Intermediary determines he does not have the expertise within his own organization to solve the SME's problem, he must request technical assistance from an outside source.

Need & Background Info: There are two distinct parts of this block of information. In the first part, the Client's need refers to the actual problem, the SME's reason for wanting to solve it, the resources he has to put toward a solution, the time frame in which it must be solved, etc. The background information refers to the data on the company and the requester's previous attempts to determine a solution to the problem.

Qualified Client: The qualified client is one that meets the criteria for receiving assistance. In some cases, through the interview process, the qualified client has a clearer picture of what his problem is and what courses of action, or options, are available to him. The qualified client understands his role in the problem solution and has established reasonable expectations of what the assistance provider system can do for him.

CONTROLS:

Policies: (See A-0)

MECHANISMS:

Intermediary Personnel: (See A-0)

Databases: (See A-0)

Computer Systems: (See A-0)

NODE: Text	TITLE: Perform Intermediary Function	NUMBER: Page 1

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 5/28/93		WORKING	READER DATE	CONTEXT:
A0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A2 - Promote Technology Availability Awareness

This function is the outreach activity for the Intermediary. The purpose is to make the SME aware of the technologies and the assistance which he/she can employ to put him/her in compliance and to make him/her more competitive. The basic premise of this function is that even though the Intermediary may know of the best technology available and the easiest way to implement it, the SME's either may not know about it or are skeptical that it will really help them. Therefore, the Intermediary must SELL the services that he has to offer. This requires a marketing plan and a method of obtaining feedback from the "Customers", both of which are activities in this function.

The goals of this activity include (1) communicating to SME's new and impending environmental, health and safety regulations. (2) Communicating and demonstrating the application of technology to environmental issues, (3) Communicating and demonstrating simple solutions to common problems, (4) Case studies of successful companies, and (5) Results of special studies.

INPUTS:

ID'd Problem/Solution Set, Global Audience, and Marketing Materials: The STARS database will archive problems and their solutions for manufacturers. As multiple requests to solve the same (or similar problems) become apparent, this information will become part of the outreach activity. SME's will be made aware that the issue exists and that there is a solution, which has been successfully demonstrated with other companies. The Global Audience is that group of manufacturers that could potentially benefit from the solution set. If the global audience is large enough, training opportunities will be identified and implemented. Marketing materials come from success stories, developed materials, etc.

SME Behavioral Data: (See A-0)

SME Goals: (See A-0)

OUTPUTS:

Information: (See A-0) In addition, this information will include information on new and impending regulations in environment, health and safety, the types of services available to SME's, examples of typical problems seen by other companies similar to theirs, types of solutions available, and the advantages of seeking and using new ways of meeting compliance issues.

NODE: Text	TITLE: Perform Intermediary Function	NUMBER: Page 2

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 5/28/93		WORKING	READER DATE	CONTEXT:
A0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A2 - Promote Technology Availability Awareness (con't)

CONTROLS:
Policies: (See A-0)
Fiscal Budgets: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systerms: (See A-0)
Training Facilities: (See A-0)

A3 - Identify Proper Resources or Expert

The primary activity of the STARS program is matching up clients and their needs with appropriate resources. The STARS counselor has a database of assistance providers, equipment, facilities, consultants, financial resources, etc. The STARS counselors are continuously updated on the real capabilities of the resource available to them.

The counselor calls the resource that seems to be a good match for a given client, discusses the problem with the resource and the resource tells the counselor if they think they can help. If the resource agrees to take the case, he/she will call the client and make arrangements to work with the client on the problem. STARS will track and followup on this activity.

INPUTS:
Request for Technical Assistance: (See output, A1)
Intermediary Staff Training: (See A-0)
Need & Background Info: (See ouput, A1)
Qualified Client: (See ouput, A1)

A3 - Identify Proper Resources or Expert (con't)

INPUTS (con't)

Requirement for Additional or Different Resource: During the task of developing the problem solution, additional resources may be required to solve the problem. This may be because the originally identified resource did not have all of the required knowledge or skill, time, funding, etc. or that new or additional aspects of the problem were uncovered during the search for the solution. Assistance providers may occasionally attempt to solve a symptom of the problem and not the root cause. The solution to the root cause may require different resources than the solution to the problem symptom.

OUTPUTS:

ID'd Resource: This may be an organization, an individual, or an assembled team of organizations or individuals. Based on the understanding of the problem, the Identified Resource represents the best available expertise to solve the issues. This is a combination of knowledge, available time, permission from sponsoring organization, etc.

CONTROLS:

Capabilities: (See A-0)
Policies: (See A-0)
Fiscal Budgets: (See A-0)
Unbiased Requirement: (See A-0)

MECHANISMS:

Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systerms: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 6/1/93		WORKING	READER DATE	CONTEXT:
A0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A4 - Find Problem Solution

Except for very simple problem solutions, technical resources will go through a formal process to determine the best solution to the root cause of the problem. The problem's solution begins with a meeting between the client and the technical resource. At this point the client meets with the technical resource to define, as exactly as possible, the issues. Next, the client and the expert explore alternatives and then evaluate those alternatives based on a pre-determined set of criteria. Using the best alternative concept, a solution is developed that will meet the client's needs.

INPUTS:

ID'd Resource: (See output A3)

Need & Background Info: (See ouput, A1)

Qualified Client: (See ouput, A1)

OUTPUTS:

Request for Studies: (See A-0)

Problem Solution: The problem solution may be as simple as identifying information requested by a client to a complex problem requiring an engineered solution, evaluation of alternative solutions, prototyping, etc. Constraints on the solution (such as cost, size, complexity, etc.) are set by the client.

Requirement for Additional or Different Resource: (See input A3)

CONTROLS:

Policies: (See A-0)

Fiscal Budgets: (See A-0)

Regulations: (See A-0)

Unbiased Requirement: (See A-0)

Capabilities: (See A-0)

MECHANISMS:

Intermediary Personnel: (See A-0)

Databases: (See A-0)

Computer Systerms: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 6/8/93		READER DATE	CONTEXT:
A0	PROJECT: INTERMEDIARY MODEL	REV: 2 6/8/93	WORKING		
			DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10		RECOMMENDED		
			PUBLICATION		

A5 - Prepare & Deliver Service/Assistance

In the simplest of cases, this may be trivial. When training is involved in the solution, this activity may be quite complex. Intermediaries may need to be trained first, curriculum and training materials must be developed, etc. The essence of this activity is providing the solution to the problem in a format that will meet the clients requirements. If the client (customer) is not completely satisfied then, in essence, there was no solution.

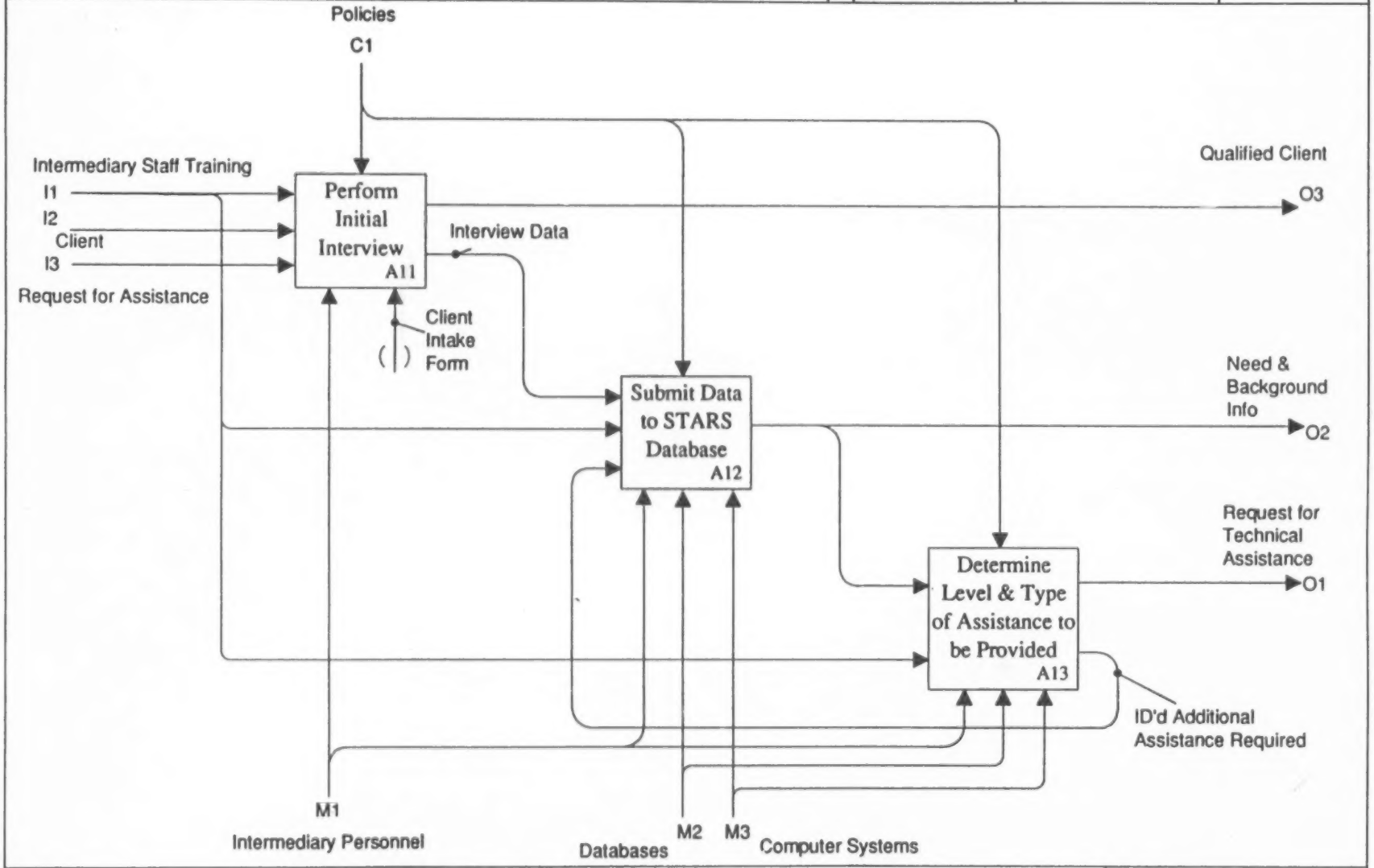
INPUTS:
Problem Solution: (See output, A4)
Qualified Client: (See output, A1)
SME Feedback Data: (See A-0)

OUTPUTS:
Information: (See A-0)
Direct Assistance: (See A-0)
Training: (See A-0)
Network Facilitation: (See A-0)
Satisfied Client: (See A-0)
ID'd Problem/Solution Set, Global Audience, and Marketing Materials: (See Input A2)

CONTROLS:
Policies: (See A-0)
Fiscal Budgets: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)
Capabilities: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systerms: (See A-0)
Training Facilities: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 5/20/93 REV: 2 6/8/93	WORKING	READER DATE	CONTEXT:
			DRAFT		
			RECOMMENDED		
			PUBLICATION		



NODE: A1	TITLE: Make Initial Contact (SME)	NUMBER:

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/1/93		WORKING	READER DATE	CONTEXT:
A1	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		■ □ □
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A11 - Perform Initial Interview

The first task in providing assistance to any SME is having a trained intake counselor conduct an initial interview. This includes cases where an assistance provider contacts the SME, makes him aware of an issue and asks if he needs help addressing the issue. (The assistance provider is being pro-active in this case.) The interview may be conducted by a member of the STARS staff or directly by one of the state's assistance providers. In either case, this interview is used to accomplish 3 things:

1) Identify the SME - This includes name, address, background information about the SME, and economic data such as sales revenue and geographical distribution, assets, and employment level.

2) Characterize the SME's need - This critical step involves the identification and interpretation of the SME's problem or need, including ancillary and/or deeper root causes of the problem. The characterized problem/need is then written up in sufficient detail that an outside technical resource can determine whether he/she is capable of providing the assistance requested.

3) Qualify the SME as a Client - The SME is interviewed to determine if his/her company and his/her problem meet certain criteria to qualify for assistance. The criteria used include the following:

- The SME has a fairly well characterized problem/need
- The SME has or plans a legitimate, bonified business which could benefit economically from the requested assistance.
- That the request for services to solve problems using available, existing resources and that the services requested are legal.

If the SME is not accepted, the counselor should inform the SME of the reason(s) and make suggestions for preparing him/her to be a client at a later date, if appropriate.

If the assistance provider is not capable of determining the objectives of the three criteria stated above, he/she should refer the client to an assistance provider that is more familiar with the clients type of problem.

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/28/93		READER DATE	CONTEXT:
A1	PROJECT: INTERMEDIARY MODEL	REV: 2	WORKING		
			DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10		RECOMMENDED		
			PUBLICATION		

A11 - Perform Initial Interview (Cont'd)

INPUTS:
Intermediary Staff Training: (See A-0)
Client: (See A-0)
Request for Assistance: (See A-0)

OUTPUTS:
Qualified Client: (see A1)
Interview Data: This data includes basic information about the company (name, address, phone number, etc.), plus a description of the problem, SME's attempt at solution, etc. The documented anecdotal information must be complete enough for the actual assistance provider to read it and determine if he/she is qualified or has the resources to provide the assistance.

CONTROLS:
Policies: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Client Intake Form: A form used by the intake counselor to document the interview. This document requests information such as name, address, phone number, basic business information, business description, and nature of assistance requested. There is a statement of agreement and limitation of liability, which is signed by the client.

NODE: Text	TITLE: Make Initial Contact (SME)	NUMBER: Page 2

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/7/93		WORKING	READER DATE	CONTEXT:
A1	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		☐ ■ ☐
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A12 - Submit Data to STARS Database

Client information can be entered into the STARS Database in several different ways. If the initial interview is conducted by STARS Staff, they will enter the data directly. If the initial interview is conducted by any of the other assistance providers, they will FAX or E-Mail the data to STARS for manual entry or, if the intermediary has been trained on the STARS system and has been granted Read/Write access to the database, they can electronically enter the data into the database. Because of the sensitivity of the data and the requirement for the maintenance of its integrity, granting of Read/Write status will only be granted after careful consideration.

INPUTS:

Interview Data: (See A11)

Intermediary Staff Training: (See A-0)

ID'd Additional Assistance Required: After determining the level and type of assistance required, STARS or the Assistance Provider who is working the client's problem, may determine that additional assistance is required, such as the universities, the Federal Labs, etc.

OUTPUTS:

Need and Background Information: (See A0)

CONTROLS:

Policies: (See A-0)

MECHANISMS:

Intermediary Personnel: (See A-0)

Databases: (See A-0)

Computer Systems: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/7/93		WORKING	READER DATE	CONTEXT:
A1	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		☐ ☐ ■
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A13 - Determine Level & Type of Assistance to be Provided

This activity requires the Intermediary to develop a correlation between the client's problem/need and the type of available resources to solve the problem. The level and type of assistance may be providing the client with information, assisting him/her work through an issue, providing training, providing an expert in a business or technical discipline, or accessing specialized equipment.

This activity further requires the Intermediary to determine the relative level of effort/expense that should be undertaken on the client's behalf. Such a judgement is based on the client's level of committment and ability to utilize assistance, the availability, time commitement, and expense of the resource required, and the potential economic impact of the assistance.

INPUTS:

Intermediary Staff Training: (See A-0)

Need and Background Info (See A1)

OUTPUTS:

Request for Technical Assistance. (See A1)

ID'd Additional Assistance Required: (See A12)

CONTROLS:

Policies: (See A-0)

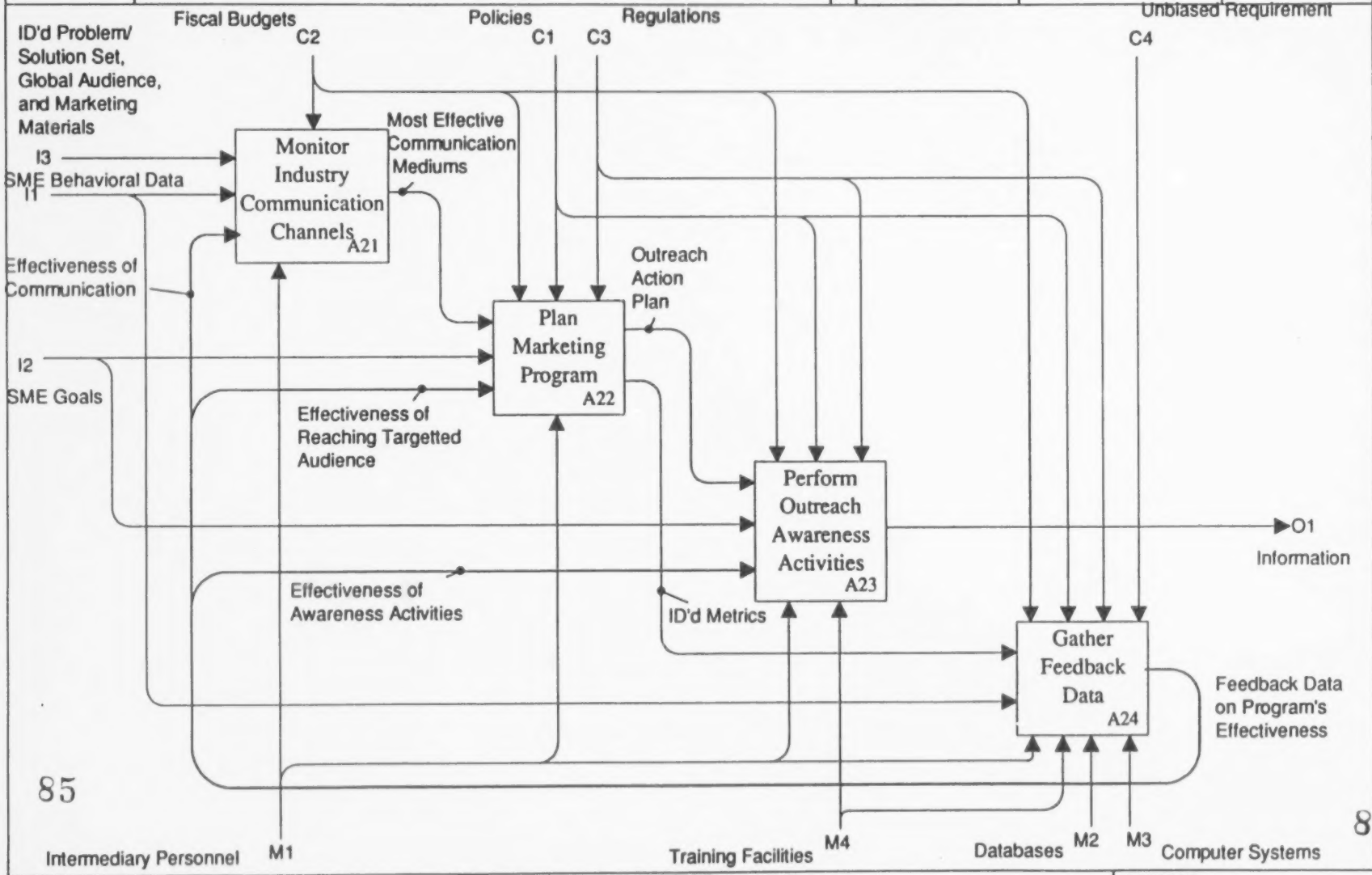
MECHANISMS:

Intermediary Personnel: (See A-0)

Databases: (See A-0)

Computer Systems: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 5/7/93 REV: 2 6/8/93		WORKING	READER DATE	CONTEXT:
				DRAFT		
				RECOMMENDED		
				PUBLICATION		



85

86

NODE: A2	TITLE: Promote Technology Availability Awareness	NUMBER:

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/14/93		WORKING	READER DATE	CONTEXT:
A2	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A21 - Monitor Industry Communication Channels

Every industry has its own particular way of communicating between its members. This varies from industry to industry and from state (or region) to state. Some industries have strong associations, some are tied together by their suppliers or customers, some communicate through networks, and some industry members are isolated and disjoint from one another. Understanding the nature of this interaction and how to use it to communicate with the industry members in an effective and efficient way is critical for the operation of the assistance provider and Intermediary network. This knowledge will provide the basis for the outreach part of the marketing plan.

INPUTS:

ID'd Problem/Solution Set, Global Audience, and Marketing Materials: (See A0)

SME Behavioral Data: (See A-0)

Effectiveness of Communication: To be successful, the awareness program must be constantly gathering feedback data to evaluate the effectiveness of its communications to industry members. This feedback data on communications will allow the Network members to continuously evaluate the validity of their assumptions about industry communication channels.

OUTPUTS:

Most Effective Communication Channels: As mentioned in the definition of this activity, understanding how industry members communicate is critical to the success of this program. This output is the result of the analysis and provides data as a function of industry and geographical location, about how intercompany communication works and the level of its effectiveness.

CONTROLS:

Fiscal Budgets: (See A-0)

MECHANISMS:

Intermediary Personnel: (See A-0)

NODE: Text	TITLE: Promote Technology Availability Awareness	NUMBER: Page 1

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/14/93		WORKING	READER DATE	CONTEXT:
A2	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A22 - Plan Marketing Program: This activity acknowledges that even the best and most necessary program must be sold. Small business is inundated with all kinds of help, some even free. To rise above the noise, this program must be presented to the SME in a simple, effective, and consistant manner. The marketing plan requires constant input from the "customer" (the SME) to determine the needs of the businesses it is trying to serve. The two key outputs of this activity are an Outreach Action Plan and a set of identified metrics to measure the success of the marketing activity.

INPUTS:
Most Effective Communications Mediums: (See A21)
SME Goals: (See A-0)
Effectiveness of Reaching Targetted Audience: Part of the activity of the marketing program planning is identification of metrics to determine whether the program is reaching the customer. This input is the data summary of this continuously gathered set of data identified by the metrics.

OUTPUTS:
Outreach Action plan: The primary output of the development of the marketing plan is a tactical plan for communication with the SMEs to raise their level of awareness of the need for environmental compliance, how that will affect their business and where they can turn for help to solve compliance problems. This action plan is very pro-active and assumes that the requirement for environmental compliance must be sold to the SME and that it is a tough sell.
ID'd Metrics: During the development of the marketing plan, a set of metrics to determine the quality of the outreach program will be determined. Included in this is a specification of the type and frequency of the data collection and how it will be analyzed and summarized

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/15/93		WORKING	READER DATE	CONTEXT:
A2	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A23 - Perform Outreach Awareness Activities: This function represents the implementation of the marketing plan. The outreach activities will be performed by various organizations: assistance providers, Intermediaries, and technology sources. The activity is coordinated by the developer of the marketing plan. The activities will include presentations at meetings, workshops, training sessions, written communications, technology demonstrations, etc. The type of activity will be dependent on the industry.

INPUTS:
Outreach Action Plan: (See A22)
SME Goals (See A-0)
Effectiveness of Awareness Activities: This is another measure of the feedback process. This measure determines the effectiveness of raising the level of awareness of the SME with respect to environmental compliance issues. Tracking this input will allow the organizations involved in the awareness activities to adjust their marketing techniques to insure maximum results for a given amount of effort.

OUTPUTS:
Information: (See A-0)

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Training Facilities (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/15/93		WORKING	READER DATE	CONTEXT:
A2	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A24 - Gather Feedback Data: This very important activity is the primary technique for listening to the "Voice of the Customer" (the SME). In order for the assistance providers to be able to advance the SME's to the level of World Class, the business and technical assistance process must go through a continuous process improvement. This activity is the data gathering and analysis part of that methodology. The metrics for each industry will be determined in the marketing plan development function. The analysis of that information will provide feedback information on the effectiveness of the marketing effort. This data will provide effectiveness information on their awareness raising activities, their ability to reach the targeted audiences and how well they've identified each industrys communication channels. This information will be written into and analyzed on the STARS database.

INPUTS:
ID'd Metrics: (See A22)
SME Behavioral Data: (See A-0)

OUTPUTS:
Feedback Data on Program's Effectiveness: This is a summation of the Effectiveness of Awareness Activities data, the Effectiveness of Reaching Targetted Audiences data, and the Effectiveness of Communication data. These have been defined in the input sections of A23, A22, and A21 respectively.

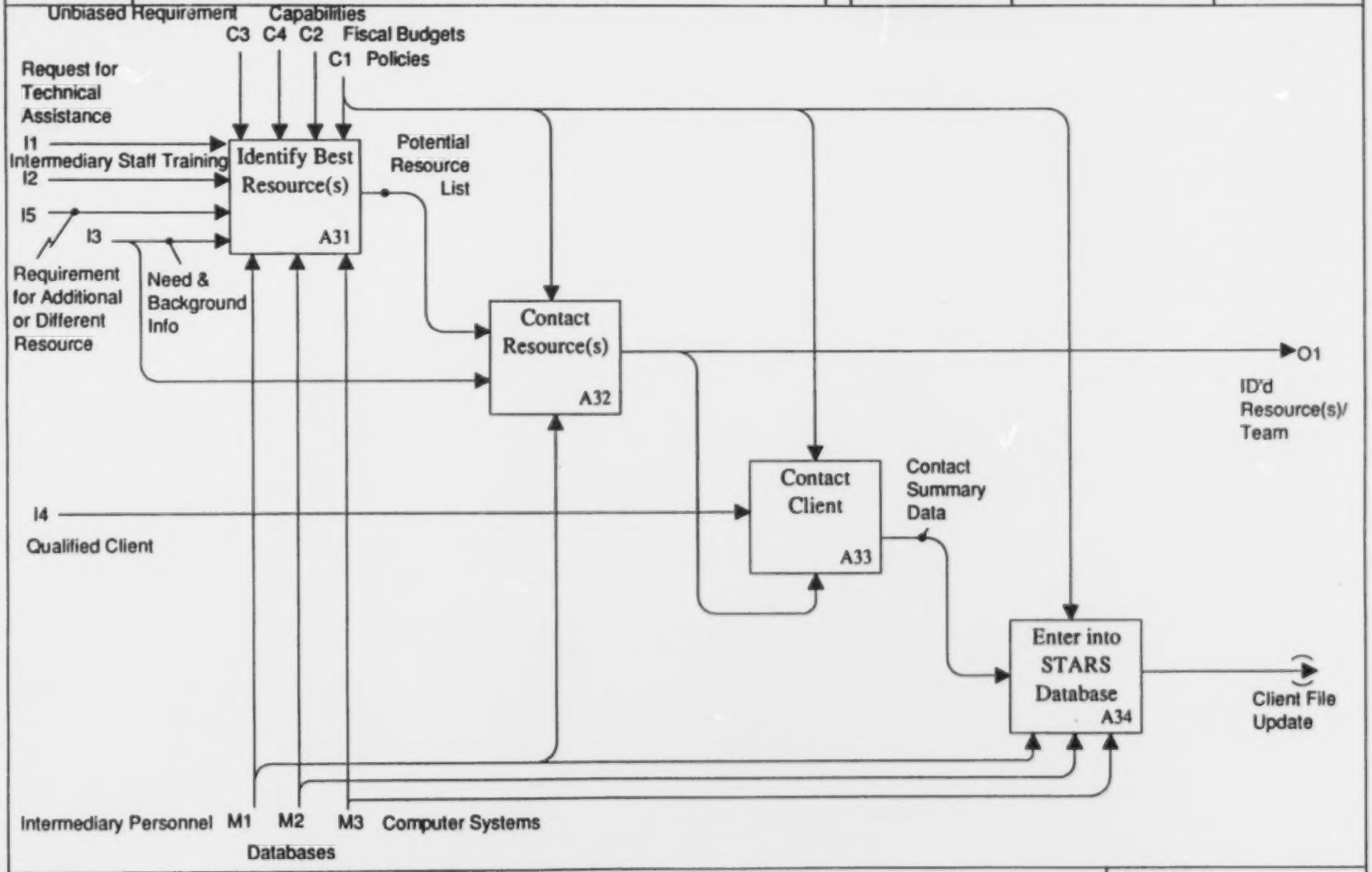
CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Training Facilities (See A-0)
Databases: (See A-0)
Computer Systems:(See A-0)

93

94

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 5/21/93 REV: 2 6/8/93	WORKING	READER DATE	CONTEXT:
			DRAFT		
			RECOMMENDED		
			PUBLICATION		



NODE: A3	TITLE: Identify Proper Resource or Expert	NUMBER: 96

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/16/93		WORKING	READER DATE	CONTEXT:
A3	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A31 - Identify Best Resource(s): The primary task of STARS is to know the capabilities and resource availability of all assistance providers and sources of technology. While any Intermediary can seek the resources required to solve their clients problems, many will request assistance from the STARS staff. The staff are trained in working with technology sources plus they have a database of capabilities and past client history from which to draw.

INPUTS:
Request for Technical Assistance: (See A0)
Intermediary Staff Training: (See A-0)
Requirement for Additional or Different Resource: (See A0)
Need & Background Information: (See A0)

OUTPUTS:
Potential Resource List: This list of potential resources to solve the client's problem is developed by researching the STARS database or by relying on the Staff's experience with similar issues.

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems:(See A-0)

98

97

NODE: Text	TITLE: Identify Proper Resource or Expert	NUMBER: Page 1

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/16/93		WORKING	READER DATE	CONTEXT:
A3	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A32 - Contact Resource(s): The Intermediary will contact the resource, describe the vital statistics of the company, the problem, and any constraints known at the time. The resource is then asked if they are able to help the client within the guidelines and constraints required by the client. (For example, the client may need a solution within a certain time frame and with a specific cap on costs.) For multi-faceted problems, the resource may be a team comprised of several individuals or organizations.

INPUTS:
Potential Resource List: (See A31)
Need & Background Information: (See A0)

OUTPUTS:
ID'd Resource(s)/Team: (See A0)

CONTROLS:
Policies: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)

NODE: Text	TITLE: Identify Proper Resource or Expert	NUMBER: Page 2

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/16/93		WORKING	READER DATE	CONTEXT:
A3	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
				RECOMMENDED		
	NOTES: 1 2 3 4 5 6 7 8 9 10			PUBLICATION		

A33 - Contact Client: The identified resource will contact the client and arrange a meeting to discuss the client's issues. The resource person will make an effort to contact the client in a reasonable amount of time (less than two days, if feasable). A STARS Staff member will follow-up to see if the contact was made and a meeting was arranged.

INPUTS:
Qualified Client: (See A0)

OUTPUTS:
Contact Summary Data: The resource individual will provide contact summary data to STARS for input into the STARS database. This data will allow STARS to perform its project management role and will provide a base of statistics for analysis on qualitative aspects of the assistance process. For example, if it is determined that timely response is an area for improvement, the STARS database will have the historical statistics for information on baseline average time of response and standard deviation.

CONTROLS:
Policies: (See A-0)

MECHANISMS:
ID'd Resource(s)/Team: (See A0)

102

101

NODE: Text	TITLE: Identify Proper Resource or Expert	NUMBER: Page 3

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/16/93		WORKING	READER DATE	CONTEXT:
A3	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A34 -Enter into STARS Database: The STARS database maintains a file on every client. The information on the clients is used for project management tracking, project reporting, related experience reference data, and statistical analysis for continuous improvement of the assistance providing efforts.

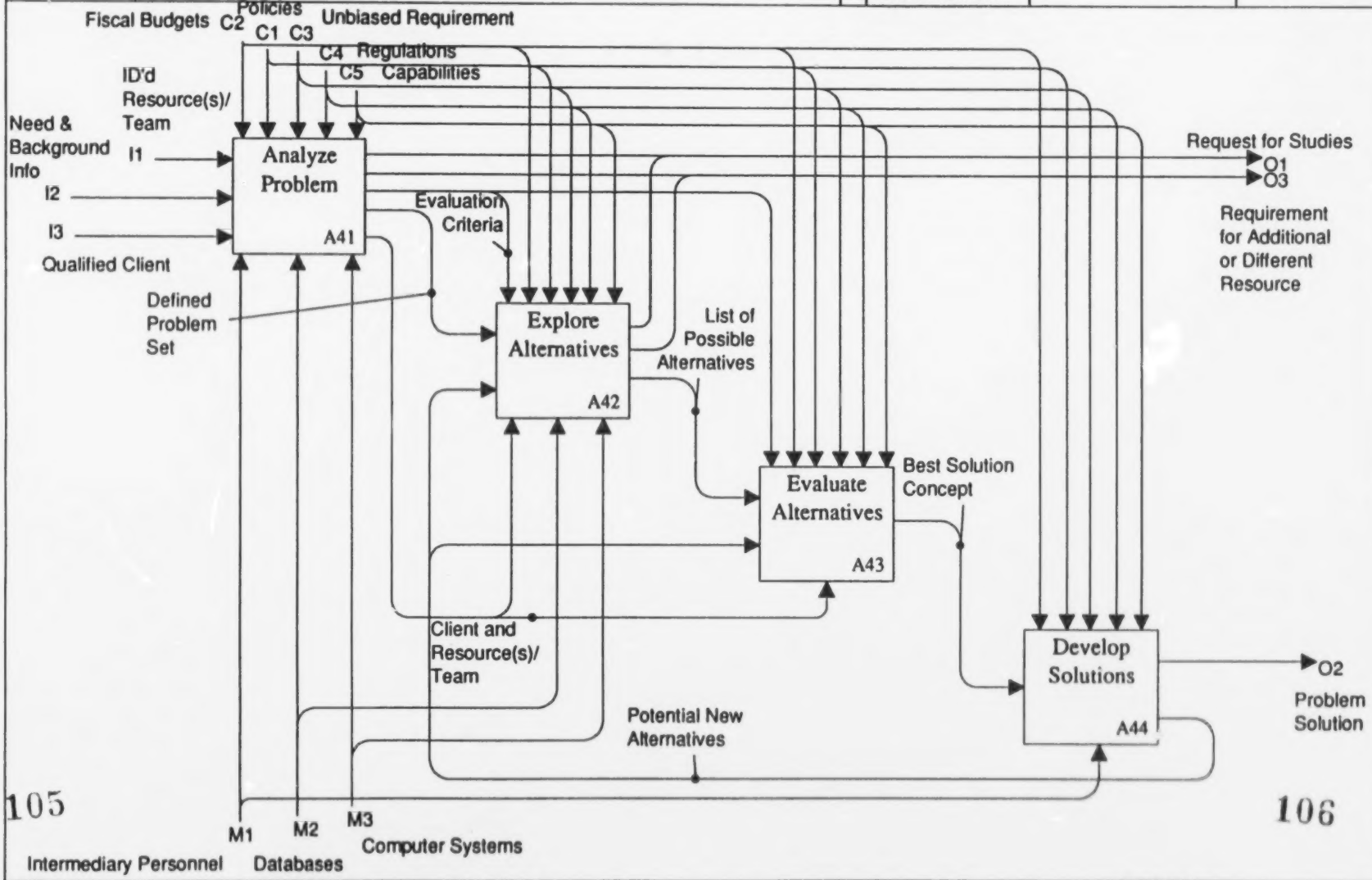
INPUTS:
Contact Summary Data: (See A33)

OUTPUTS:
Client File Update: Each client has a file on the STARS database that is maintained by the STARS staff. The file is updated after each transaction between the client and an assistance provider or technical resource.

CONTROLS:
Policies: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems:(See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 5/18/93 REV: 2 6/8/93	WORKING	READER DATE	CONTEXT:
			DRAFT		
			RECOMMENDED		
			PUBLICATION		



105

106

NODE: A4	TITLE: Find Problem Solution	NUMBER:

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/19/93		WORKING	READER DATE	CONTEXT:
A4	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
				RECOMMENDED		
	NOTES: 1 2 3 4 5 6 7 8 9 10			PUBLICATION		

A41 - Analyze Problem: This activity involves considerable interaction between the client and the assistance resource. After a review of the intial interview data, both parties must agree on EXACTLY what the problem is. After a plant walk-through, related data will be reviewed, such as business plans, strategic plans, etc., customers identified, stakeholders in the clients company or outside of the company identified, solution boundries established, constraints identified, and evaluation criteria established (for evaluating alternative problem solutions). A root cause analysis will be performed to determine if the problem presented by the client is a problem or merely a symptom of another problem. The client's expectations of the outcome must be established and if they are beyond the capability of the resource, either the expectations must be modified or the resource must return to STARS for additional different help.

INPUTS:
ID'd Resource(s)/Team: (See A0)
Need & Background Information: (See A0)
Qualified Client: (See A0)

OUTPUTS:
Request for Studies: (See A-0)
Requirement for Additional or Different Resource (See A0)
Evaluation Criteria: This is the set of metrics, determined by the client, that will be used to evaluate multiple alternative solutions to the problem. These criteria might include, but are not limited to, cost, rate of return, risk, new business opportunity (or loss), etc. It is important to determine the selection criteria before development of problem solution alternatives.
Defined Problem Set: The primary output of the "Analyze Problem" function is a clearly defined problem (not just a symptom of a problem), and boundries around the affected environment. After the "Analyze Function" activity, the problem and the problem boundries are well understood by both the client and the assistance provider/technical resource.
Client and Resourc(s)/Team: After exploring the ramifications of the problem, the client and the assistance provider or technical resource(s)/Team form a partnership to explore the best solution for the client.

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/19/93		WORKING	READER DATE	CONTEXT:
A4	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A41 - Analyze Problem: (Continued)

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems:(See A-0)

NODE: Text	TITLE: Find Problem Solution	NUMBER: Page 2

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/19/93		WORKING	READER DATE	CONTEXT:
A4	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A42 - Explore Alternatives: When an obvious solution does not exist, the client and the technical resource will brainstorm alternative solutions to the problem. It is understood that in some instances this is not necessary, as the best solution has been determined in other similar cases. During alternative solution generation, all parties are encouraged to be creative and comprehensive in coming up with new ideas. Evaluation of the alternatives does not occur at this time.

INPUTS:
Defined Problem Set: (See A41)
Potential New Alternatives: During the development of the detailed solution, new alternatives, not discovered during the alternative brainstorming session, may arise. This additional information should move the cycle back to the explore alternatives function.

OUTPUTS:
Request for Studies: (See A-0)
Requirement for Additional or Different Resource (See A0)
List of Possible Aternatives: With each alternative must be enough description to be able to perform an evaluation. Therefore, the "list" will consist of the alternative's name plus a brief description and any additional information or specifications available at the time.

CONTROLS:
Evaluation Criteria: (See A41)
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems:(See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/19/93		WORKING	READER DATE	CONTEXT:
A4	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A43 - Evaluate Alternatives: There are basic two activities related to this function. The first is the development of enough detail for each alternative to be able to select the best one. For example, this may include cost benefit analysis, risk analysis, etc. The second activity is to apply the selection criteria to the alternatives , which will provide a prioritized list of alternatives. Following this procedure will give the client a high level of comfort that the solution is the best for his business and his situation.

INPUTS:
List of Possible Alternatives: (See A42)
Potential New Alternatives: (See A42)

OUTPUTS:
Best Solution Concept: Out of the activity of prioritizing the list of alternatives will emerge one solution that meets the evaluation criteria better than the rest. Until more detail is developed, it is only a concept. The detail comes in the next step.

CONTROLS:
Evaluation Criteria: (See A41)
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Client and Resource(s)/Team (See A41)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/19/93		WORKING	READER DATE	CONTEXT:
A4	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A44 - Develop Solutions: This activity may range from gathering information about off-the-shelf-products to fully engineered hardware or software or any combination of the above. Enough information or design must be complete to develop an implementation and training plan to prepare for the next task, which is implementation of the solution.

INPUTS:
Best Solution Concept: (See A43)

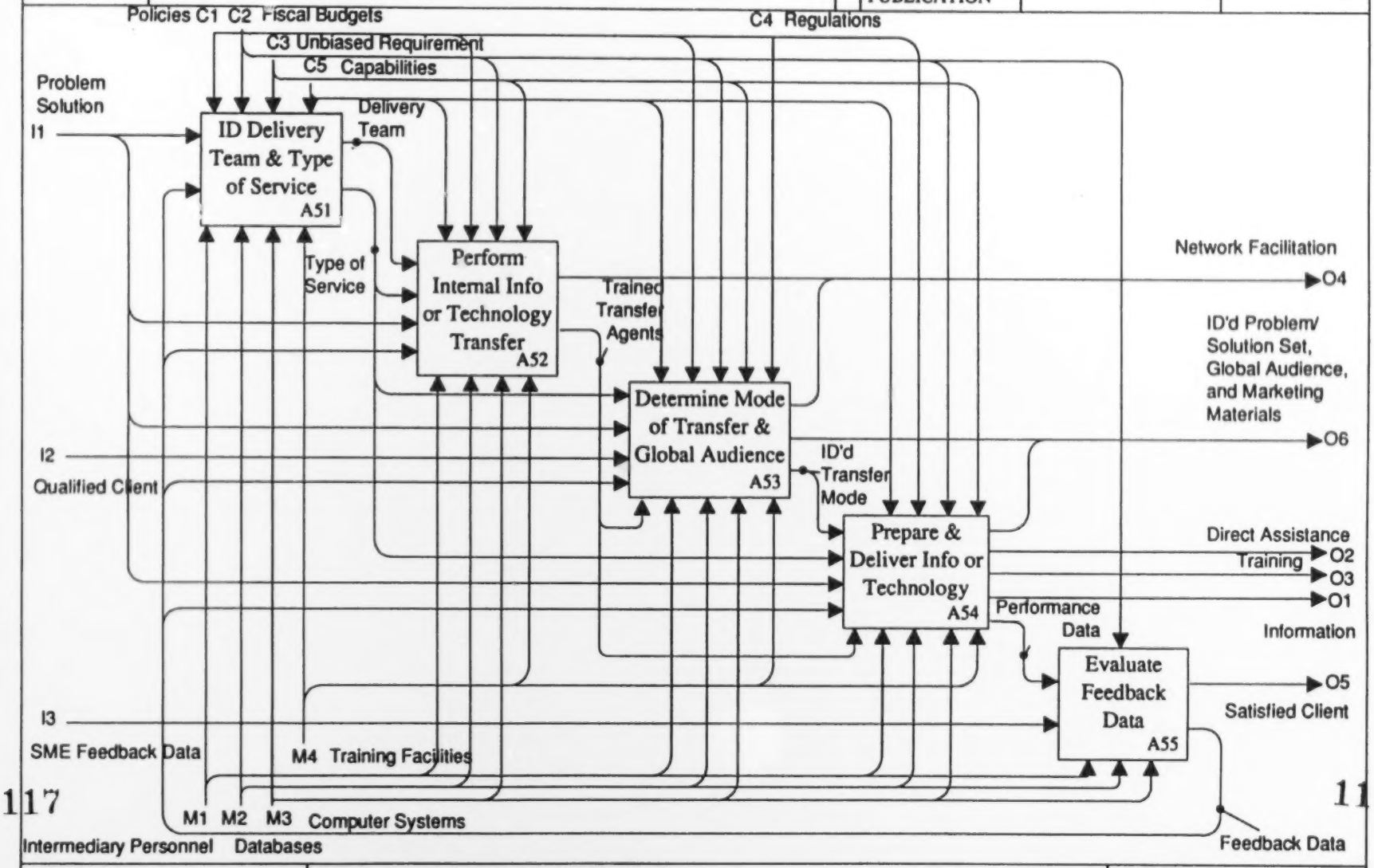
OUTPUTS:
Problem Solution (See A0)
Potential New Alternatives: See A42)

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Regulations: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Intermediary Personnel (See A-0)

NODE: Text	TITLE: Find Problem Solution	NUMBER: Page 5

USED AT:	AUTHOR: ECO WORKING GROUP PROJECT: INTERMEDIARY MODEL NOTES: 1 2 3 4 5 6 7 8 9 10	DATE: 6/6/93 REV: 2 6/8/93	WORKING	READER DATE	CONTEXT:
			DRAFT		
			RECOMMENDED		
			PUBLICATION		



NODE: A5	TITLE: Prepare & Deliver Service/ Assistance	NUMBER:

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/20/93		WORKING	READER DATE	CONTEXT:
A5	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A51 - ID Delivery Team and Type of Service: The first step in this activity is to determine what is required for implementation of the problem solution. This might include engineering design, system integration, training, etc. The extra resources required for implementation will comprise the Delivery Team. The Delivery Team will meet with the technical resource and the client to develop an implementation strategy.

INPUTS:
Problem Solution: (See A0)
Feedback Data: The feedback data is information on the success (or failure) of the implementation activities formatted in such a way as to be useful to the delivery team. In most cases, this feedback data will come from STARS analysis activities.

OUTPUTS:
Delivery Team: This is the group of organizations and individuals that will be involved in the implementation of the solution of the problem. The team will be briefed on the issues during this activity.
Type of Service: The type of service (Engineering design, system integration, education, training, etc.) for the complete implementation of the solution has been identified.

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems: (See A-0)
Training Facilities: (See A-0)

NODE: Text	TITLE: Prepare and Deliver Service/Assistance	NUMBER: Page 1

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/21/93		WORKING	READER DATE	CONTEXT:
A5	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A52 - Perform Internal Info or Technology Transfer: The team involved in the tech transfer is provided the information or the training on the use of and the ramifications of the new technology. For example, the two-year school staff will learn how to train workers on the use of the new technology, SBDC personnel will learn how to help businesses secure financing for the new technology, system integrators will learn how to interface the new technology with existing equipment and data systems, etc.

INPUTS:
Delivery Team: (See A51)
Type of Service:(See A51)
Problem Solution: (See A0)
Feedback Data: (See A51)

OUTPUTS:
Network Facilitation: (See A-0)
Trained Transfer Agents: This is the team of assistance providers that have been trained in the use and other business ramifications of the new technology or information and are ready to help SME's with the implementation and training processes.

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems: (See A-0)
Training Facilities: (See A-0)

NODE: Text	TITLE: Prepare and Deliver Service/Assistance	NUMBER: Page 2

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/21/93		WORKING	READER DATE	CONTEXT:
A5	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A53 - Determine Mode of Transfer & Global Audience: Using surveys and info from established networks and the STARS database, this task seeks to identify other companies that would be able to benefit from this information or new technology. The goal is to transfer the problem solution to as many candidate companies as possible. These companies represent the global audience. Required information on the global audience includes typical size of operation, knowledge of technology and regulatory rules, degree of homogeniety between companies, etc.

INPUTS:
Type of Service:(See A51)
Problem Solution: (See A0)
Qualified Client: (See A-0)
Feedback Data: (See A51)

OUTPUTS:
Network Facilitation: (See A-0)
ID'd Problem Set, Global Audience, and Marketing Materials: (See A0)
ID'd Transfer Mode: This is the best medium for transferring information and/or technology to a large number of companies in the most effective possible manner. It is industry and technology specific.

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)
Regulations (See A-0)

MECHANISMS:
Trained Transfer Agents: (See A52)
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems: (See A-0)
Training Facilities: (See A-0)

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/21/93		WORKING	READER DATE	CONTEXT:
A5	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A54: Prepare & Deliver Info or Technology - Information and technology must be prepared in a format which is usable by the client and the global audience based on their frame of reference and background. If training is involved, training curriculum and teaching materials must be prepared. A very significant part of this activity is that it is client centered, so that preparation of deliverables is based on meeting the total needs of the client.

INPUTS:
ID'd Transfer Mode: (See A53)
Type of Service:(See A51)
Problem Solution: (See A0)
Feedback Data: (See A51)

OUTPUTS:
ID'd Problem/Solution Set, Global Audience, and Marketing Materials: (See A0)
Direct Assistance: (See A-0)
Training: (See A-0)
Information: (See A-0)
Implementation Results: Data on the results of the implementation for the client are submitted to STARS database for recording and analysis.

CONTROLS:
Fiscal Budgets: (See A-0)
Policies: (See A-0)
Unbiased Requirement: (See A-0)
Capabilties: (See A-0)

MECHANISMS:
Trained Transfer Agents (See A52)
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems: (See A-0)
Training Facilities: (See A-0)

NODE: Text	TITLE: Prepare and Deliver Service/Assistance	NUMBER: Page 4

USED AT:	AUTHOR: ECO WORKING GROUP	DATE: 7/21/93		WORKING	READER DATE	CONTEXT:
A5	PROJECT: INTERMEDIARY MODEL	REV: 2		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

A55 - Evaluate Feedback Data: Data is gathered during the delivery preparation on the effectiveness of the team's interactions and on their cooperation with the client. The results of the implementation and whether it met the client's expectations are evaluated and periodic long term measurements of the effectiveness of the problem solution measured. This data is combined, analyzed, and charted to provide a measure of the effectiveness and quality of the technology transfer or problem solution.

INPUTS:
Performance Data: This is the information on the effectiveness of the implementation/training program. The data is gathered from both the transfer team and the client.
SME Feedback Data: (See A0)

OUTPUTS:
Satisfied Client: (See A-0)
Feedback Data: (See A51)

CONTROLS:
Fiscal Budgets: (See A-0)

MECHANISMS:
Intermediary Personnel: (See A-0)
Databases: (See A-0)
Computer Systems: (See A-0)

NODE: Text	TITLE: Prepare and Deliver Service/Assistance	NUMBER: Page 5